

## I. OVERVIEW OF THE CONFERENCE PROGRAM

The *Expanding Opportunities in Oceanic and Atmospheric Sciences* conference (the second in the Expanding Opportunities effort) was held March 29-31, 1999 at the Richard A. Henson Center of the University of Maryland Eastern Shore, Princess Anne, Maryland. Two hundred and forty-one participants from state, private, majority and minority colleges and universities, government agencies, and research laboratories attended this conference sponsored by the National Atmospheric and Oceanic Administration's (NOAA) line offices and five co-sponsors external to NOAA. Complete lists of co-sponsors and attendees are provided in the Appendices. The conference's four objectives were as follows: 1) to assess the progress made from the first conference held in June 1995, 2) to strengthen the links between Historically Black and Minority-Serving College and University (HBMSCU) undergraduates and institutions with graduate programs in the oceanic, atmospheric, and environmental sciences, 3) to examine the relationships between HBMSCUs and NOAA and the way business is now done, and 4) to develop a set of strategies and actions to increase the number of minorities who are educated and employed in the oceanic, atmospheric, and environmental sciences.

Conference participants were welcomed by Dr. Eucharia E. Nnadi, Vice President of Academic Affairs, University of Maryland Eastern Shore. The charge to the group under the theme, *Too Few to Count: Building Sustainable Alliances*, was jointly given by Mr. Scott Gudes, Deputy Under Secretary for Oceans and Atmosphere, NOAA, and Dr. Earl S. Richardson, President of Morgan State University, and Chairman, President's White House Initiative Advisory Board on HBCUs. Moderator for the presentation of the charge was Dr. N. Joyce Payne, National Association of State Universities and Land-Grant Colleges. Two other featured speakers addressed the group. Mr. Robert Mallett, Deputy Secretary, U.S. Department of Commerce gave the keynote address, and Dr. Dolores Spikes, President of the University of Maryland Eastern Shore spoke at the conference banquet.

A series of eight panel discussions focusing on a range of topics, including Opportunities in Marine and Atmospheric Sciences Then, Now, and Beyond Y2K and Building and Expanding Sustainable Alliances Between HBMSCUs and NOAA. Three working groups looked at issues particular to atmospheric, oceanic/marine, and coastal/limnological sciences while reviewing the current relationships between NOAA and academia, particularly those with the HBCUs. Working lunch periods provided time for free discussion, networking, and visiting classes at the University of Maryland Eastern Shore.

Dr. Ambrose Jearld, Jr., Conference Chairman and Dr. Andrew Rosenberg, Deputy Assistant Administrator for Fisheries closed the conference with remarks about *Promises Yet to Keep*.

## **II. WELCOME: Dr. Eucharia E. Nnadi, Vice President of Academic Affairs University of Maryland Eastern Shore**

Dr. Nnadi welcomed the attendees, on behalf of the University of Maryland Eastern Shore. It is my privilege to represent the University of Maryland Eastern Shore family. Welcome to UMES, the best kept secret in higher education. She emphasized the importance of the conference, a conference to promote careers in oceanography, atmospheric and several supporting fields. Conferences like this are very important because as we all know there are very few minorities in most science fields. It is wonderful to see so many people of color in the sciences present in one place.

Dr. Nnadi commended and chastised NOAA suggesting we need your help. I am sure you here are very aware of some of the challenges we at HBCUs and minority-serving institutions face, particularly making the best out of very little. We appreciate all the efforts you have made for us in the past and I am grateful for NOAA's recognition of the importance of HBCUs. However, when I recognized that only 0.3% of your funding went to research at HBCUs, I was very disappointed. We need your help in making sure you increase your funding to help us with all our efforts. For their part, HBCUs were encouraged to become more collaborative. Sometimes our resources get so thin that we can't do it alone. At that point, we must reach out to each other to make it happen.

Dr. Nnadi thanked all those who made this conference possible, including Dr. Ambrose Jearld of NOAA and Dr. Okoh of UMES. We appreciate all your hard work. If any of you in the audience have not been involved in putting a conference such as this together you will have no idea the amount of work [these individuals have done]. She then welcomed the featured speakers, stating, We welcome Dr. Joyce Payne, Director of Office of Advancement of Public Black Colleges at National Association of State Universities and Land-Grant Colleges (NASULGC), Mr. Scott Gudes, Deputy Under Secretary of Oceans and Atmosphere, NOAA and Dr. Earl Richardson, the President of Morgan State University, our pride and joy. We welcome our president, Dr. Delores Spikes, as well as Dr. Andrew Rosenberg, the Deputy Assistant Administrator at NOAA Fisheries . . . And we are honored that Mr. Mallett, Deputy Secretary of the Department of Commerce will speak to us later on this morning and we are especially grateful for his support for HBMSCUs.

She challenged everyone to continue to work on the expanding opportunities effort, even after the conference was over, and recommended that we always think of how we can best help our students, how we can best increase the number of students going into the sciences. Again, welcome to UMES, the land of Expanding Opportunities, and thanks for honoring us with your presence and, more importantly, for choosing our beautiful campus as the location for this great conference.



### III. CHARGE TO THE CONFERENCE

*Moderator:* Dr. N. Joyce Payne, Director,  
Office for the Advancement of Public Black Colleges  
National Association of State Universities and Land-Grant Colleges

*Too Few to Count: Building Sustainable Alliances*  
Mr. Scott B. Gudes  
Deputy Under Secretary for Oceans and Atmosphere  
National Oceanic and Atmospheric Administration

Charge to the Community  
Dr. Earl S. Richardson, Chairman  
President's White House Initiative Advisory Board on HBCUs  
President, Morgan State University

#### Guiding Questions

- ☐ ☐ What is the representation of minorities in oceanic/marine, environmental, and atmospheric professions within academic institutions and the workforce?
- ☐ ☐ What has the trend been over the last five years?
- ☐ ☐ How can NOAA and academia work together to improve minority access to employment and educational opportunities in the oceanic/marine, environmental, and atmospheric professions?
- ☐ ☐ What are those traditions that should be retained and those that should be relinquished to ensure success in improving minority access?
- ☐ ☐ Of what importance is it that minority access to employment and educational opportunities in the oceanic/marine, environmental, and atmospheric professions be significantly improved?
- ☐ ☐ What are realistic measures of success of minority participation in the oceanic/marine, environmental, and atmospheric professions?

#### Dr. N. Joyce Payne The Conference Charge

Dr. N. Joyce Payne set the conference tone and laid out the challenges conference participants face as they explore and implement ways to increase minority representation in marine and atmospheric sciences. We have the awesome charge of trying to put this conference in motion, by challenging you to do what is best for the nation, NOAA, and

for the minority communities we serve. Dr. Payne said we have two responsibilities: 1) to increase the numbers of minorities who enter the sciences and 2) to make a radical change in how we go about the business of doing this.

In 1996, minorities accounted for only 3% of those in the sciences; within the atmospheric sciences, this number sinks to only 1%. This percentage by no means represents the commitment that HBCUs and Hispanic-serving institutions have made in making a difference. How, then, can we find better ways to increase diversity? Thus the fundamental charge to the conference is to explore these issues and to find better ways to make a difference.

Dr. Payne recognized attendees who have . . . advanced the land-grant mission and the historically Black colleges and universities, and introduced representatives from three Maryland congressional districts, including Lee Wiley, for Senator Paul Sarbanes, Cindy Betts, for Senator Barbara Mikulski, and Jody Beecham, for Congressman Wayne Gilchrest. She extended her acknowledgment of individuals who have worked strenuously on behalf of these institutions, including Dr. Richardson, President, Morgan State University. She explained that Dr. Richardson did not just lobby Congress; he educated Congress and helped them understand the critical nature of increasing diversity in the sciences. Dr. Payne added that Dr. Richardson also played a major role in creating an appropriation of more than \$30 million from the Department of Education for support of graduate programs at HBCUs in areas of national need.

Dr. Payne ended with a strong message about our ethical and moral obligation to increase diversity and social democracy as a means of improving the quality of life for all Americans. She then introduced the two featured speakers Mr. Scott B. Gudes and Dr. Earl S. Richardson as individuals who can set the charge in motion and help us move the conference agenda forward.

### **Mr. Scott B. Gudes An Overview of NOAA**

Mr. Gudes gave an in-depth presentation on NOAA's programs. He commented on the lack of public knowledge about NOAA, saying I find when I go out around the country and talk about NOAA, people shake their heads up and down, and I realize they don't really know what NOAA does. He observed that even if people are familiar with a particular component of NOAA, such as the National Weather Service, they do not realize this is a part of NOAA. Accordingly, he gave an overview of NOAA, its mission, and its different line offices. NOAA, he said, has two major missions. We do environmental assessment and prediction, and we provide environmental stewardship for the nation by protecting the oceans, marine species, and the nation's shorelines. NOAA also is the atmospheric and oceanic forecast and warning system for the nation.

NOAA, which was created in 1970, has an operating budget around \$2.2 billion and employs around 12,000 people scattered around this country and around the world. We actually have a Corps officer in the South Pole who helps measure the ozone each day. There are also several key sites for NOAA Seattle, Boulder, Kansas City, Miami, Tampa, and St. Petersburg. A good portion of the budget goes to our Satellite Services which provides information for all of our line offices.

NOAA has five separate line offices National Ocean Service (NOS), National Marine Fisheries Service (NMFS), National Weather Service (NWS), Oceanic and Atmospheric Research (OAR), and National Environmental Satellite, Data, and Information Service (NESDIS): [A NOAA organizational chart is presented in Appendix E]. The National Ocean Service traces its lineage all the way back to 1807 with the creation of the Coast Survey. It is responsible for mapping, charting, hazardous materials, and damage assessment like the Exxon Valdez and like the algae bloom outbreak. NOS manages marine sanctuaries and estuarine reserves like the Coastal Zone Management Program and the Coastal Services Center.

NMFS employs about 2,800 people who work with endangered species, fisheries management regulation, protected species recovery, and the industrial and economic impact of fishing on marine and coastal species. As you might expect, most of our budget goes into building sustainable fisheries and recovering protective species.

The Office of Oceanic and Atmospheric Research (OAR) is our long-term research arm that researches the science that helps all our line offices do their job. OAR does air quality, climate, severe storm dynamics, research and development on observing systems, and marine and undersea research. In short, OAR looks at long-term global impact and change. OAR's laboratories are concentrated in Boulder, Colorado; Miami, Florida; and Norman, Oklahoma.

Our largest line office is the National Weather Service (NWS) which employs about 4,800 people. NWS does both long- and short-term weather predictions, including the severe weather watches you see on TV. NWS also does hydrology, flood forecasting. NWS is perhaps the most underrated line office, as most people believe their local weather forecasters are actually gathering the data that allows them to make weather predictions.

Finally, there is the National Environmental Satellite, Data, and Information Service (NESDIS) that controls the satellite systems that gather atmospheric data. NESDIS, along with NWS, tracks the hurricane systems. There are also a few components of NOAA that do not fit neatly into the line offices structure. For instance, the NOAA Corps, which is the seventh uniform service in the United States, flies aircraft directly into hurricanes and operates fisheries research vessels on the ocean. Mr. Gudes recognized Admiral Select Evelyn Fields, who was selected to

take over the NOAA Corps and its 2,400 officers. Evelyn was the first African-American woman to command a U.S. vessel, the *MacArthur*, and we re proud of her.

In short, NOAA is about life on earth from outer space with our stationary satellite 220 miles in geostationary orbit to the bottom of the ocean with our deep submersibles. Mr. Gudes expressed his deep personal interest in and commitment to NOAA, which he described as an agency that has more to do with people s lives on a daily basis than any other federal agency, because this agency deals with Mother Nature and the effects Mother Nature has on us and we have on her.

NOAA is a vital and powerful institution for the nation. However, for all its power, Mr. Gudes went on to say, NOAA has not increased its percentage of minorities in the past ten years. From 1984 to 1994, minorities accounted for a consistent 12% of its total workforce, and most of these were employed in lower level positions.

Mr. Gudes described NOAA 's diversity plan as a multi-level strategy with its logo: Many faces, One vision. The diversity plan has five objectives:

1. Attract students to its workforce by offering internships that convert to permanent employee status after graduation.
2. Hire more minorities at the GS-13 level.
3. Develop management support from the top to get a more diverse workforce.
4. Examine the culture of NOAA, assessing how the agency views and values diversity, and changing the climate to be more supportive of minority employees.
5. Create sustained relationships with community and academic institutions, in particular proposing a million dollar initiative with HBCUs to create centers of excellence.

In his conclusion, Mr. Gudes encouraged conference participants to engage in fruitful dialogue. This conference presents a special opportunity for outreach. It is an opportunity to build relationships.

### **Dr. Earl S. Richardson A Charge to the Community**

Dr. Richardson pressed conference participants to consider the essential role that HBCUs have and continue to play in producing minorities with bachelor degrees. He cautioned the audience not only to think of the physical beauty of the campus but also to contemplate what goes on in the classroom. This is a very beautiful campus, but the real beauty takes place in the classroom, in what happens to the young people who come here, and HBCUs have a critical role in the education of minorities. He offered some crucial statistics: The under-representation of minorities occurs in all disciplines, even education. Whites are twice as likely to have a B.Sc. degree than Blacks. What this means is that before we can talk about finding people to populate

our workforce, we have to talk first about educating them. HBCUs, he said, enroll only 16% of all Black students in higher education, but produce 30% of the Black population who hold baccalaureate degrees and 28% of those in the sciences, engineering and mathematics (SEM). In physical sciences, the numbers are even higher, with HBCUs granting 47% of the degrees. Just as we have produced a disproportionately high percentage of the SEM degrees at the undergraduate level, HBCUs hold the same potential for graduating African-Americans at the master's and doctoral levels. In 1998, 27 African-Americans received doctoral degrees in electrical engineering; with appropriate resources, HBCUs can more than double production in that discipline.

To demonstrate the potential of HBCUs, Dr. Richardson compared business and education, saying where there is the greatest yield you should invest accordingly. The effectiveness of HBCUs in educating people make them a prime place for government agencies, like NOAA, to invest their time and money. He noted that \$2 billion of research funds go to five majority universities, yet in spite of these significant investments, the numbers of minorities in the sciences remain unchanged. Dr. Richardson urged that the research and development funding be reallocated to include HBCUs and thus ensure that these institutions will have as much of an impact at the graduate level as they now do at the undergraduate level. HBCUs are doing a great job with our undergraduates; now we must do an even better job with our graduate students by become part of the community of institutions producing PhDs in the sciences. If each institution increased its doctoral rate by one person, it would have a huge impact on the national figures. We must invest where minority students are the HBCUs as only that will significantly increase diversity in the sciences. Increased research funding, he added, provides the research experience needed to socialize students into the profession, by training them to think like scientists: to analyze like scientists, to pose questions like scientists. The Research Experience for Undergraduates (REU) allows African-American students to experience being scientists and is generally far more important to an African-American student who has no other medium through which to get that experience.

Dr. Richardson also spoke of the need to increase minority access to science education, by increasing financial aid, and enriching educational opportunities at all levels. Forty-nine percent of African-American families with children 18-24 years old make annual incomes of \$20,000 or less. Juxtapose this with educational costs. Educational costs at Morgan State University, for example, are approximately \$10,000 for Maryland residents and \$15,000 for non-residents. We're not even talking about private institutions these are publicly-funded institutions. Financing is simply a major barrier to our students. But through our relationships with federal agencies, such as NOAA, we can bring financial and research resources for these students.

Dr. Richardson ended by echoing Dr. Payne's words, that to increase diversity in the sciences is in the best interest of the nation.



**IV. KEYNOTE ADDRESS: Mr. Robert Mallett, Deputy Secretary**  
**U.S. Department of Commerce**

**Guiding Questions**

- ☐ Why are alliances between Government Organizations and HBMSCUs important to America's future in Y2K?
- ☐ What unique characteristic of HBMSCUs must be considered when building these alliances?
- ☐ What types of alliances are possible?
- ☐ What post-conference activities are required to ensure that these alliances are built and sustained?

Deputy Secretary Robert Mallett began by expressing his pleasure at being part of the conference and shared his personal connection with minority-serving institutions. I am a product of a minority-serving institution. I am a graduate and son of Morehouse College in Atlanta. I have an obvious affinity for the capacity of these institutions to build students into fine professionals. He then decided not to speak from his prepared notes, remarking that the first time I met with Dr. Richardson, he recited the statistics to me, and I was embarrassed because I knew we could do better. This is my second time meeting with him and speaking to you and I hope that I do better in addressing this issue than I did the first time. Mr. Mallett underscored his department's strong commitment to make things work, noting that we do such excellent things when we are committed to them. Mr. Mallett was clear that the responsibility for change should be borne by all constituencies federal agencies, NOAA, minority institutions, and majority institutions.

Several themes were repeated throughout Mr. Mallett's address:

- ☐ First, the diversity in the United States which Mr. Mallett urged the participants to recognize and be proud of. There are very few places on earth and I've been all over that have the greatness of diversity the United States does. That is our strength our diversity and our willingness to embrace different cultures. This is true in spite of our checkered history.
- ☐ Second, the significant financial investment of NOAA to the growth of large, majority, research-intense institutions. We can do wonderful things with capacity-building. The University of Oklahoma at Norman has become an expert in tornado forecasting and attracts good faculty and students. It did that with the commitment of NOAA.

- Third, the pace of change, which as Mr. Mallett noted occurs slowly. Two situations are true: we have made progress and we need to do better. We at the Department of Commerce are trying to speed up the pace of change. Part of that means we not only change our personnel practices to make the Department look more like the United States, but also we change our contracting system so that more small businesses and minority-owned enterprises

can share in our resources. We must also change the culture of the Department so we can fully embrace the gifts of diversity.

- Fourth, models for partnerships between large and small institutions. He pointed to the federal government's own success in the procurement process where agencies have . . . subcontracting programs for minority and women-owned, small businesses. He added that . . . no matter what we think about these kinds of programs, this is as it should be because that money comes from taxpayers of all stripes. Not just White people pay taxes, not just men pay taxes, women pay taxes, Blacks pay taxes . . . we all participate in creating the public purse that the government doles out, so all kinds of people should participate in the government's programs.

He further urged that smaller institutions not begrudge the larger institutions who are recipients of funds. I believe that the larger institutions of higher education will continue to be the primary recipients of most federal dollars that s a reality check for you. But they represent an opportunity, not a threat. Minority institutions must enter into partnership with larger institutions, and larger institutions must become mentors and collaborators. We all have a part in changing our culture.

- Fifth, he emphasized how HBCUs can make themselves fundable and competitive. Mr. Mallett encouraged participants to enact all forms of legislative support, to be their own advocates on the state and federal levels. Write your Congressman; write your local and state governments for funding. You must be aggressive about asking for money. You must demonstrate your commitment to your own institutions, and commit your local and state governments to assist in your endeavors. Minority-serving institutions have not done the kind of job they need to do in terms of their own advocacy. Without aggressive commitment, no partnership can thrive. He also stressed that when funding levels increase, HBMSCUs must be meticulous managers of public resources, and put the best auditors and accountants on the task.
- Finally, he advised students to be the brightest stars they can be. Participate in programs, seek exposure for yourself and others to diversity, responsibility, and intelligence. Do all this so that your institutions can show you off. Remember that we must celebrate our unique position in the globe our diversity is our strength.

Mr. Mallet not only offered suggestions to conference participants, he was also solicitous of attendees and sought their advice. While those are the positive changes in the Department of Commerce, Mr. Mallett noted that of the \$262 million of grant money awarded in the past year by the Department, only \$2.8 million, approximately 1.1% of total award money, went to HBMSCUs. We know that we have a responsibility to do better, and we need your help. We need to create new partnerships and new opportunities so that we can inspire new funding opportunities for HBMSCUs. Mr. Mallett suggested faculty members of HBMSCUs come to NOAA while on sabbatical to understand its needs and to be able to target their universities

towards training qualified students. We need your help to show us new programs, how you design your academic curriculum, how you can intersect with NOAA.

In the question and answer period that followed, Mr. Mallett was asked why do you think we're here at this conference? He responded that we're having this conference because we know that the \$2.8 million allotment was an embarrassment to the Department of Commerce and we want to improve our record of support to minority-serving institutions. This conference is a start in that direction. He emphasized again that minority investment is crucial to keep the nation running. In fifty years, it is estimated that the population of the United States will be approximately 340 million, and half of that population will be non-White. The Latino population is increasing at three times the rate of Whites; Blacks at twice the rate; Asians at three times. So it is in our self interest as a country to make sure that everybody participates, that minorities are trained as scientists and engineers. While this may seem like rhetoric, and it is rhetoric to the extent that we need to talk about these issues, this conference presents an opportunity to make institutional changes, to provide the commitment to create an infrastructure to do the right thing.

**V. CONFERENCE BANQUET SPEAKER: Dr. Dolores Spikes, President,  
University of Maryland Eastern Shore**

Dr. Spikes emphasized the tremendous service HBMSCUs provide to the nation, and she urged that they be better funded. Her urgent message began with sobering information the Southern Education Foundation in a report entitled *Miles to Go* showed that Black access to higher education has not changed substantially in twenty years. The proportion of Blacks among doctoral degree earners has not budged between now and 1976. Black representation among first time full-time freshmen in four-year institutions continues to lag behind the representation of 18 to 24 year-olds in the general population. For instance, South Carolina, where Blacks comprise a bit more than 36% of the relevant population, has only 20% Black freshmen. There are many of us, perhaps even some of us here, who tire of hearing such facts. Some even call them irrelevant. But we can not ignore the fact that in the changing demographics in the United States, African-Americans, Latinos, Asian-Americans will become the majority population. If we do not pay attention now to the needs of the workforce, we will have a crisis on our hands.

She noted that HBMSCUs provides the best support for minority students in the nation. These HBMSCUs are found in 19 states, primarily in the South, and 75% of all African-American college students were enrolled in these 19 states. Statistics also show African-Americans moving back to the south in record numbers. For these reasons, these 19 states have importance for the entire nation. We should direct more of our funding to the HBMSCUs to accommodate the expected increase in enrollment in HBMSCUs. In the state of Maryland, for example, we expect that there will be a tremendous increase in college enrollment within the next five years. The University of Maryland has projected that the greatest increase will be among African-Americans and thus foresees that the fastest growing institution in Maryland will be the University of Maryland Eastern Shore, one of the HBMSCUs.

This population growth means that HBMSCUs need to continue their aggressive stance towards funding since in these southern states the average Black family's income is not greater than \$30 thousand. She urged that HBMSCUs be committed to their programs and responsible for their funding so that they can show the nation its investment in diversity and quality. We cannot sit back and simply put our hands out and expect them to be filled. We have an obligation as well. We must have faculty who are aggressive enough and committed enough to put in the time and effort necessary to devise programs which meet the workforce demands of this country. We have no time to say that this isn't fair. Life isn't fair. And I'm not going to be satisfied with first rate baccalaureate programs only when there's a need for doctoral programs for minorities. We have the wherewithal to do this not in isolation but in partnership.

Dr. Spikes criticized NOAA for being long on talk and short on diversity, and she cautioned participants to keep track of the earlier conference proceedings. Do not make the same

suggestions as you did in 1995, she said. Not only is the situation a terrible indictment of the American dream, but the lack of progress is a further indictment. We must keep making progress; we must change our infrastructure.

She ended by reading Maya Angelou's poem, "Equality" which urges until there is true equality, there is not true freedom: *Equality and I will be free* (see Appendix F). I hope I've taken the blinders from your vision and the padding from your ears. We must have the courage to walk forward.

## VI. PANEL SESSIONS

The eight panels were the backbone of the conference, allowing those with experience and knowledge to formally present their views. The panelists provided insight on academic and government institutional culture, current and potential opportunities in the marine and atmospheric sciences, and the role of partnerships between the academic, government, and private sectors. Each panel was moderated by a representative of NOAA and/or from academia, and after all panelists spoke, the floor was opened for questions, answers, and discussion.

### **A. Panel One: *Opportunities in Marine and Atmospheric Sciences Then, Now, and Beyond Y2K***

Moderator: Dr. Andrew A. Rosenberg, Deputy Assistant Administrator  
NOAA/National Marine Fisheries Service

Panel Members:

#### *Part A: Perspectives from NOAA's Leadership*

General John J. Kelly, Jr., USAF, Ret.

Assistant Administrator, NOAA/National Weather Service

Mr. Gregory W. Withee,

Deputy Assistant Administrator for Satellite and Information Services

NOAA/National Environmental Satellite, Data, and Information Service

Dr. Ronald C. Baird, Director, National Sea Grant College Program

NOAA/Office of Oceanic and Atmospheric Research

Dr. Margaret Davidson, Director, Coastal Services Center

NOAA/National Ocean Service

#### *Part B: Perspectives from Academia's Oceanic, Atmospheric and Environmental Leaders*

Dr. Margaret Leinen, Dean of the Graduate School of Oceanography

University of Rhode Island

Dr. James Arrington, Vice President for Academic Affairs

South Carolina State University

Dr. Larry Earvin, Dean of the School of Arts and Sciences

Clark-Atlanta University

This panel identified the opportunities that are currently available to minorities in marine and atmospheric sciences and recommended steps to increase opportunities.





### Guiding Questions

- ☐ What are the prospects for employment, education and research funding for individuals and institutions in the oceanic/marine, environmental, and atmospheric professions?
- ☐ What has your organization or institution done over the past five years to enhance opportunities for minorities in the oceanic/marine, environmental, and atmospheric professions?
- ☐ What does your organization or institution plan to do in the next five years to enhance opportunities for minorities in the oceanic/marine, environmental, and atmospheric professions?
- ☐ What challenges to your success have you, or must you overcome to meet your organization's or institution's objectives to significantly improve minority participation?

### Recognizing the Growth Potential in NOAA

Dr. Andy Rosenberg described this conference as a vehicle for both NOAA and academia to strengthen their organizations by exchanging information and ideas and building partnerships. He enumerated numerous NOAA programs that currently support students, faculty, and research and reminded the conference participants that these would be discussed throughout the meeting. NOAA can increase its interactions with HBMSCUs since they provide new talent which to date has been mostly an untapped resource. He went on to say NOAA is a relatively small agency, but that this small size should not make us believe that opportunities are limited. Prior to the conference, I did a quick check and there are currently 139 vacancies within NOAA. So there are opportunities. He went on to make two key points: 1) that the strength of NOAA is increased with diversity and 2) that NOAA has the potential to expand. Gen. John Kelly seconded this idea of growth, saying the United States is subject to some of the most severe weather in the world and NOAA/NWS responds to these demands. Mr. Gregory Withee and Dr. Ronald Baird added to this, remarking that NOAA was also researching global phenomena regarding the environment, such as waste management, environmental impact, and air quality, all decidedly growth areas. Dr. Baird indicated that universities and students the next century will see expanding opportunities for both programs and careers in the environmental sciences. All panelists agreed on the importance of diversity as an integral part of NOAA's growth. Dr. Arrington attested to the success of outreach efforts. His first-hand experience working with managers at NOS and NMFS led to South Carolina State University (SCSU) graduates being employed by these two NOAA line offices. He pointed out that as agencies attempt to diversify their workforce some of their best recruiters or ambassadors are going to be satisfied employees who are graduates of HBCUs and have been treated well in the system.

### Recognizing the Growth Potential in Academia

Panelists offered multiple perspectives on how academia could and should position itself to grow and develop its infrastructure. These strategies are not dictated by the size of the institution, but can be scaled to fit the resources and capabilities of each institution. Dr. Rosenberg generally observed that academia can strengthen its programs and ability to train students, as well as convincing students that environmental science is an extremely exciting and interesting field. Dr. Arrington described the difficulties that HBCUs and state-related institutions face and the issues they grapple with on a regular basis. He specifically referred to the difficulties encountered by institutions in communicating with funding agencies and preparing entering students. Yet these difficulties have not prevented them from becoming number one among their peers in securing external research dollars, and within the top 15 institutions in graduating African-Americans with baccalaureate degrees. He implored NOAA and other federal agencies to provide us with assistance through partnerships, through collaborations, and through scholarships, as those are the kinds of opportunities we need in order to produce students who can assume positions in NOAA and participate in graduate education.

#### Academia's Transition from a Three-legged to a Four-legged Stool

Dr. Leinen noted that academia is increasingly being called on to take a more active role in economic development, as well as teaching, research, and outreach. Economic development is becoming the fourth leg of the traditional three-legged stool of teaching, research, and outreach. For example, Governors have said that the [land-grant] university's job is to be relevant to the development and growth of the state economy, and in many states we are seeing a call for the universities and the agencies with which they partner to become forces of economic development in the states. Dr. Leinen acknowledged that these changes are taking place in a climate of very limited resources, and therefore partnerships between academia and government agencies such as NOAA are essential. She pointed out that on the NOAA side, the challenge then is to find those institutions who have made a commitment, and make a strategic commitment to be partners with them. She also noted that these partnerships are not restricted to dollar contributions only, but include situations, for example, where through NMFS NOAA's personnel work directly in the university in a true partnership. In these situations, people plan the work together, they execute it together, and they discuss the impact of the work afterwards. She urged the conference participants to be creative in thinking about the types of partnerships which will extend beyond traditional university structures and mandates. Dr. Arrington informed conference participants that SCSU has already assumed a role in the economic development of the state of South Carolina through its National Aeronautics and Space Administration (NASA)-funded Center of Excellence which involves public municipalities and educational institutions.

#### Opportunities in Non-Science Fields at NOAA

**Panelists outlined the range of disciplines NOAA's employees represent and discussed the non-scientific positions that are available at NOAA. These constitute one-third of NOAA's positions and many require specialized training, including policy analysts, enforcement agents, public administrators, legal personnel, and economists. Panelists gave examples of the kinds of activities with which these professionals were involved.** Dr. Rosenberg talked about employment such as legal counsel, both in-house, and, as Dr. Larry Earvin said, as legal consultants to Congress, advocating NOAA's policies. Mr. Withee reminded the audience that

NOAA stores enormous amounts of data each year, equivalent to five Libraries of Congress, and that these data require computer specialists and librarians trained in computer archiving and retrieval. Dr. Rosenberg added that with the need for additional funds comes a real need for grant writers, people skilled in procuring funding.

## **The Success of Interconnected Programs at NOAA**

Panelists praised the success of programs developed in conjunction with private or other government agencies. Gen. Kelly remarked that NOAA itself hires 30 new meteorologists a year, and that the Navy and Air Force collectively hire between 20 and 40 people specializing in meteorology and oceanography. In addition, this year we'll bring on board about 30 students under the Oak Ridge Institute of Science and Education (ORISE) and two faculty members to work at Weather Service forecast offices. Mr. Withee said that the success of the joint Air Force and NOAA satellite program NPOES continued to increase NOAA's research and hiring capacity with over 40 new people hired this year.

## **The Success of Strong Student Programs at NOAA**

Currently there are several student programs that provide experiential learning opportunities within NOAA. These include the Sea Grant program, directed by Dr. Baird, which is a partnership between NOAA and 29 colleges, including the University of Puerto Rico, the University of Virgin Islands, and Native American Schools. Many of the local Sea Grant programs have a special relationship with their local HBCU; for instance, Maryland Sea Grant has an extension specialist located here at our host institution, UMES. Sea Grant is not a source of employment, but is an education and research facility that trains the next generation of scientists and introduces students K-12 to the marine sciences. Dr. Davidson mentioned the fellowship program that NOS runs where students work in the coastal management offices for different states, as well as the Memoranda of Understanding (MOUs) that NOS has established with Duke University. Every major agency operating under NOAA has a summer jobs program, and some of these have monies dedicated to hire minority students as full time employees such as in NESDIS. Dr. Davidson noted a National Science Foundation (NSF) survey which showed that we should capture the attention of young folks between the ages of eight and eleven because that's when they believe they still have opportunities. Mr. Withee mentioned smaller programs that sponsor minority students in college, like the joint fellowship program with the American Meteorological Society.

## **Focus on Excellence**

Dr. Arrington acknowledged that SCSU realized they can't be everything to everybody and have created several Centers of Excellence that focused on their strong areas such as Environmental Science. Historically, SCSU has strategically focused its resources on the traditional basic sciences, but in recent times has expanded into new, more specialized fields. Dr. Earvin shares this perspective, and emphasized the need for HBCUs to retain a focus on traditional curricula while simultaneously introducing students to specialties to which they may not have been exposed prior to coming to college. Dr. Earvin stated that capacity-building is essential in order for institutions to do both. Dr. Arrington described SCSU's transition into specialized fields. He specifically mentioned the Savannah River Environmental Field Station where SCSU has worked with at least three federal agencies: the Forestry Service, Environmental Protection Agency, and United States Department of Agriculture to establish this Center.

In addition, other HBCUs within a three to four hundred miles radius have full access to the Center and its resources, which affords them the opportunity to form strong collaborations on environmental issues. These Centers of Excellence are collaborative efforts which attract students to the fields, provide a qualified focus for funding, and assure that the faculty and facilities are kept up to date. Dr. Arrington reported that this Center recently received the Hammer Award, a national award for excellence. Dr. Earvin mentioned the long-term alliance between NOAA and Clark-Atlanta, where Dr. Denise Stephenson-Hawk developed an Earth Science System to ensure our students have exposure to the opportunities that exist within environmental sciences.

### **The Need for Capacity-Building**

Dr. Earvin spoke at length about the need for capacity-building, the need to ensure that academia changes and grows as marine and atmospheric fields evolve. We have to keep providing opportunities for our existing faculty to be trained, to have faculty professional development opportunities . . . I am currently working with an initiative, trying to develop an educational partnership program between nine schools (Clark-Atlanta University, Florida A&M, Howard University, Hampton University, Jackson State University, UMES, Delaware State University, Morgan State University, and Savannah State University) and the government. This will be a two-way partnership, benefiting all of us HBMSCUs, NOAA, and majority institutions. Capacity-building requires the direct cooperation with NOAA, good communication between research scientists and faculty, and dedicated funds that allow facilities to continually improve and develop. Dr. Earvin was emphatic that capacity-building is something that we cannot overlook. Sustained relationships we must have. The notion of a partnership is fundamental for HBCUs.

### **Interdisciplinary Connections to Marine and Atmospheric Sciences**

Dr. Leinen shared the successes of the School of Oceanography at the University of Rhode Island (URI) in preparing people for careers in marine sciences. She remarked that this success has three meanings for URI: 1) agencies, civilian and government, can call upon URI for knowledgeable, trained scientists, 2) other schools may want to look at how URI has developed its successful program, and 3) this success has begun to draw students from a much broader academic background. She said, whereas before one would get an undergraduate degree and accidentally stumble your way to the marine sciences, now there are different ways of getting to the sciences as colleges become more interdisciplinary. Students are recognizing that there are a number of diverse ways to work within the marine and atmospheric sciences. In particular, Dr. Leinen stressed that academia and NOAA should take a broad view and push into the area of economic development, as this has become the natural extension of the (fourth part) land-grant model.

### **Specific Recommendations:**

- ☐ HBMSCUs need to develop a national K-12 program to get students interested in marine and atmospheric sciences.

- NOAA needs to coordinate, on a national level, its opportunities for minorities.
- NOAA and HBMSCUs need to have consistent faculty exchanges so that government and academia can engage in mutually beneficial interactions and exchanges.
- HBMSCUs want real partnership not just funding. NOAA needs to find ways to be actively involved with the work they fund and have a visible physical presence.
- There must be a presence in Washington that lobbies for increased federal funding earmarked for diversity.
- Sustained, long-term partnerships have proven to be the most valuable. This is the primary model NOAA and HBMSCUs should use in their continued work.

## **E. Panel Two: *Student Perspectives A Reflection on Institutional Culture***

Moderators:

Dr. Brian Bingham, Huxley College of Environmental Sciences

Mr. Robert Stockman, Strategic Planner  
NOAA/National Weather Service

Panel Members:

Danica R. Starks, Senior, International Studies and Economics  
American University

Ricardo Lopez, Senior, Marine Biology  
University of Alaska

Avery Henry, Senior, Computer Science Major  
University of Maryland Eastern Shore

Rafael Mahecha, Junior, Department of Physics  
Jackson State University

Ashanti Johnson-Pyrtle, PhD Candidate, Chemical Oceanography  
Texas A&M University

Kelly Clark, PhD Candidate, Marine Estuarine and Environmental Science  
University of Maryland College Park

This panel discussed why students chose marine and atmospheric sciences, the support they have received, and the barriers they have experienced.

### **Guiding Questions**

- ☐ Why did you choose a career in the oceanic/marine, environmental, or atmospheric fields?
- ☐ What are some of the joys and pains you have experienced as you study and work in the oceanic/marine, environmental, or atmospheric fields?
- ☐ What or whom has been most helpful to you in your academic institution or the workplace? Have you been mentored?
- ☐ Have you participated in professional or trade organizations and how have these been helpful?
- ☐ Have you participated in experiential learning programs (internships or traineeships) and how have these been helpful to you?
- ☐ What advice do you have for younger students interested in the oceanic/marine, environmental, or atmospheric professions?

## **Choosing a Career in Marine and Atmospheric Sciences**



Local environment and early exposure are the two factors which had the most influence on participants' career choices. Growing up in a place of natural beauty made some students more sensitive to their environment. Ricardo Lopez said, "Growing up in Alaska, you grow up in awe of the environment. It is important for Alaskans to know about their environment. For those who were raised far from the ocean, early exposure to the marine sciences made a profound difference: I grew up in West Texas, far from the ocean, but was exposed to the marine sciences in the third grade and have been attracted to it ever since," said Ashanti Johnson-Pyrtle. Rafael Mahecha commented that the global effect of weather determined his choice, since "no matter where you go, the weather is there and affects everyone." Finally, several students mentioned the popularity of Jacques Cousteau who, through his television programs, gave wide exposure to the marine sciences.

### **A Variety of Opportunities**

One remarkable characteristic of the panelists was the variety of career paths they had chosen. Ashanti Johnston-Pyrtle and Ricardo Lopez are both in the marine sciences and each had benefited from a fellowship that promoted diversity—a fellowship from the Ford Foundation and an REU fellowship at the Scripps Institute of Oceanography (SIO). Kelton Clark is also a marine science scholar, who chose marine science after a career in restaurant management. Danica Starks is currently working as a foreign affairs research assistant and she hopes to go into U.S. Trade and Economic Policy, possibly focusing in the area of ocean sciences and fisheries. Rafael Mahecha is a meteorology major, currently doing some research for a NWS sponsored program. Avery Henry is a computer science major who says her internship at the NOAA Fisheries in Woods Hole was one of the best. "I was exposed to a new environment, new science, and new people all in one summer."

### **Acknowledging What Makes a Difference: Support Systems and Mentors**

All of the students identified people in their lives who have made a real difference. Faculty and peer mentors and the opportunity to become a peer mentor were mentioned as the most significant factors in student success. Also valuable were those people who helped students navigate the bureaucracy of the government and other agencies, and those people and institutions who provided connections to other opportunities, such as the American Indian Science and Engineering Society for Mr. Lopez. Mr. Clark talked about how too often the people who were closest to the minority communities lacked knowledge about the marine sciences. "When I left the dream of Jacques Cousteau and went out into my community, the possibility of making my dreams come true wasn't there. I would speak to my minister, to my aunts and uncles, about this career, and no one had any idea what I was talking about." Mr. Clark advocated that students write articles for predominantly minority publications in order to

increase the exposure of marine sciences within the Black community. Ms. Starks also advocated travel to broaden exposure to people and places: Traveling helps broaden your perspective; many youths from underprivileged areas have only seen fish that comes out of a TV dinner box.

### **Reasons for Attrition: Cultural and Financial Barriers**

Students listed four central reasons why minority students either left programs in marine and atmospheric sciences or never enrolled.

1. Financial Burden. Forty-nine percent of minority families with children of college age earn less than \$20,000 per year. This creates significant barriers to attending college. High tuition rates for college and graduate school discourage students. Minority students often are at a disadvantage in knowing how to find scholarships and loans.
2. Cultural Insensitivity. One student said that there are PhD students who settle for M.S. degrees just to leave the program, since some other students whisper about the African-American graduate students. Another said that it was difficult knowing that White students saw her as representing the entire race.
3. Unresponsive People. Students complained about people who are not responsive to inquiries about these careers and those who do not provide enough information for minority students, specifically how to take student skills and turn them into a career.
4. Lack of Publicity. Students said that HBMSCUs do not publicize their marine science programs.
5. Lack of Managerial Support. One student asked that managers arrange for students to meet with people in their related fields, encourage them to learn more about the organization, show students that there are real possibilities beyond summer internships, and finally, to treat students with respect.

### **Specific Recommendations for Other Students:**

- ☐ Be visible in your community as a representative of the marine and atmospheric sciences.
- ☐ Be on your best behavior and be aware of your own negative attitudes.
- ☐ Meet people go out and shake hands.
- ☐ Choose a field because it is your passion.
- ☐ Apply for every scholarship available.
- ☐ Join the appropriate professional organizations.
- ☐ Don't get discouraged if you don't immediately get a job network.
- ☐ Take advantage of every opportunity, especially hands-on programs.
- ☐ Go into the unknown that's where scientists are!

- Publish university and NOAA announcements and articles in minority targeted journals and news outlets to increase the exposure and access of minorities and underserved individuals to oceanic, atmospheric and environmental services.

**K. Panel Three: *Agency Perspectives Support for Programs in Marine and Atmospheric Sciences***

Moderators:

Dr. Denise Stephenson-Hawk, Chair, Department of Physics  
Clark-Atlanta University  
Member, NOAA Science Advisory Board  
Dr. Brad Brown, Director, Southeast Fisheries Science Center (SEFSC)  
NOAA/National Marine Fisheries Service

Panel Members:

Mr. Frederick J. Thompson, Senior Environmental Protection Specialist  
U.S. Environmental Protection Agency  
Dr. Matthew Gilligan, NSF:CIRE/REU  
Savannah State University  
Dr. Ian MacGregor, Senior Science Associate  
NSF Directorate of Geosciences  
Dr. James Harrington, NASA

This panel discussed the existing programs and recommended additional ones.

**Guiding Questions  
Existing Programs**

- ☐ What are some examples of programs where minority representation has been successful? Many existing programs were named. Mr. Thompson talked about two MOUs with HBCUs, one with North Carolina Agricultural and Technical State University (NCA&TSU) located in Greensboro, North Carolina, and another with North Carolina Central University (NCCU) located in Durham, North Carolina. The Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards
- ☐ What are some examples of programs where minority representation has been successful at these levels: (a) pre-college; (b) undergraduate; (c) graduate; (d) post-doctoral; (e) faculty; and (f) institutional levels?
- ☐ How successful have you been in increasing the numbers of minorities employed in your agency or institution in the last five years? What factors contributed to your success?
- ☐ How can government agencies pool their resources to support programs that increase minority representation in the oceanic/marine, environmental, and atmospheric professions?

ultural and Technical State University (NCA&TSU) located in Greensboro, North Carolina, and another with North Carolina Central University (NCCU) located in Durham, North Carolina. The Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards

(OAQPS) primary focus is training and retaining Environmental Scientists and Engineers at the undergraduate, graduate, and post-doctoral levels via this initiative.

The EPA's Office of Air Quality Planning and Standards has thus far had a good measure of success retaining qualified minority interns. The OAQPS generally supports about 20-25 minority students each summer, most of whom are undergraduates. Many of them continue their training by enrolling in graduate school. Others are given offers to continue their employment with the agency.

The EPA has pooled its resources with NOAA via an interagency agreement. Many of the agency's atmospheric modelers are NOAA employees. This partnership was established more than ten years ago and has been very successful. EPA regularly supports 60-plus summer interns, with a retention rate of 75%. Dr. Gilligan said the early growth and success of a new undergraduate marine science degree program at Savannah State University, an HBCU, benefited significantly from long-term collaboration with NOAA, specifically the Southeast Fisheries Science Center and Panama City Laboratory in the 1980s. Current grants, awards, collaboratives, and partnerships at SSU exist with the Ocean Sciences Division of NSF (REU and CIRE programs), Georgia Sea Grant College Program, Harbor Branch Oceanographic Institution, Skidaway Institute of Oceanography, and Gray's Reef National Marine Sanctuary. Most recently, the Title III Program at SSU (Department of Education) is assisting with the development of a new Center for Marine, Environmental Science, and Biotechnology Research. This office should help significantly in coordinating partnerships between SSU and agencies. Dr. Stephenson-Hawk mentioned the MOU between NOAA and Clark-Atlanta University. She also listed the two programs Clark-Atlanta University has recently developed—an earth sciences program and an Environmental Management Center where students can gain work experience.

Dr. MacGregor said, Most major oceanographic institutions have a program for minority students to assist them in entering the workforce. Another effective way of attracting minority students, he said, is through major centers such as the storm center at the University of Oklahoma, but he urged that these centers be given independence to run their own programs and not be under the control of the federal government.

### **Kindergarten through Graduate School: An Integrated Approach**

Several of the panelists advocated more exposure in the lower grades to the marine and atmospheric sciences. Dr. MacGregor reminded the audience that the Geosciences used to be a major part of K-12 curriculum, and he saw a need to integrate this curriculum back into the schools. In particular, he wanted an integrated system of education, where introduction to marine and atmospheric sciences in the primary grades would lead to more intensive research in the upper grades, and all the way to providing work opportunities in these fields. While he agreed with this idea, Dr. Brown cautioned that sometimes advocating by science mission

agencies (in contrast to those with an education mission) to emphasize K-12 science education has been a way of avoiding commitments to the recruitment, retention, and advancement of minorities. He advocated for partnering with K-12 educators, but focusing educational support on undergraduates and graduate students who are doing research and can be employed within a reasonable period of time.

## **Casting Wider Nets**

Dr. Harrington asked both HBMSCUs and NOAA to work in truly interdisciplinary ways. Interdisciplinary work creates flexibility and produces more successful students and employees. Dr. Brown added his support and asked also that NOAA keep an eye on creating diversity not just through its own job hires but also through its contract work. Therefore, the hiring of contract workers should be used to advance NOAA's diversity plans; contractors can be approached to fill a future opening at NOAA with a minority individual.

## **Building Technological, Fiscal, and Cultural Infrastructure**

Participants emphasized the need for strong infrastructures. Dr. Harrington reminded the audience that since technology changes at such a rapid pace, the infrastructure must be flexible enough and well-funded enough to change as necessary. A strong infrastructure cannot be achieved with only a one-to-two-year commitment. It must be long-lasting, with sufficient ongoing fiscal investments combined with a strong desire to make a difference in the institution's capacity to be competitive. Cultural infrastructure must be treated in the same way and viewed with the same degree of seriousness. Minority employees and students cannot merely be added to the existing agency or academic structure. Their backgrounds must be taken into account and fully utilized; they must be represented at all levels of an institution.

## **Scientists as Adjunct Faculty**

The question and answer period focused on using NOAA scientists as adjunct faculty. Drs. Gilligan and Brown said this would be a great support for both institutions involved. Dr. Stephenson-Hawk said we are trying to institute a rotating position for a NOAA person on campus.

## **Specific Recommendations:**

- ☐ ☐ Support high schools in places such as New York City by investing in weather stations that, for example, record data on the heat island effect.
- ☐ ☐ Increase support for graduate programs.
- ☐ ☐ Bring HBMSCUs into the broader federal efforts, e.g. Florida Restoration Program.
- ☐ ☐ Hire more faculty to work with NOAA during the summer.

#### **E. Panel Four: *Enhancing Professional Partnerships with the Private Sector***

Moderators:

Mr. Julian M. "Skip" Wright, Senior Advisor

NOAA/ National Weather Service

Dr. Benjamin Cuker, Associate Professor of Marine Science

Hampton University

Panel Members:

Mr. Jason Taylor, Meteorologist/Engineer

Litton/PRC Inc.

Mr. Andrew Humphrey, Meteorologist

WRC-TV/NBC4

Mr. Aaron O. Morgan, Jr., President

21st Century Aquaculture, Inc.

Mr. Michael J. Marcheselli, CEO

Electronic Innovators, Inc.

Mr. Kevin McCarthy

Benthos, Inc.

This panel looked at opportunities for collaboration among the private, government, and academic sectors.

#### **Guiding Questions**

- ☐ How can the private sector and academia work together to enhance their research and development capabilities?
- ☐ What are some of the cutting-edge technologies available in the commercial sector for scientific investigation?
- ☐ What new advances and breakthroughs are projected in the next five years?
- ☐ What are the "hot areas" for future employment in the private sector?
- ☐ What types of training and skills do students need to be competitive for employment in the private sector?

#### **Current Collaborations with the Private Sector**



Mr. Michael Marcheselli stated that ship design is an example of where the private, government, and academic sectors meet, as designers and engineers continually try to improve ship's capacity and utility. Most ship design work is currently done in collaboration with the federal government. Mr. Kevin McCarthy of Benthos said that his company continually looks for new and better ways to improve technology; Benthos actively works with NOAA, the Woods Hole Oceanographic Institution (WHOI), and Scripps Institution of Oceanography and maintains an ongoing dialogue with academia. All participants agreed that these types of collaboration ensure that commercial as well as government and academic research facilities have the latest information and can plan their research programs accordingly. Mr. Jason Taylor added that NOAA and Litton/PRC formed a partnership to design, implement, and integrate the Advanced Weather Interactive Processing System (AWIPS). NOAA has invested \$4.5 billion in AWIPS, which is providing forecasters with the ability to make quicker and more accurate weather forecasts in hopes of saving lives and billions of dollars in preventable weather damage.

### **Possibilities for Scientific Investigations in the Commercial Sector**

Four of the five panelists mentioned some cutting edge technology is available in the commercial sector that would benefit from further scientific investigation. Mr. McCarthy pointed to the advance in imaging technology, particularly digital cameras. Mr. Aaron Morgan said that research on fish species and the genetics of fish is the next step in aquaculture development. Further genetic research is needed to determine how fish grow and to increase their growth for the commercial food market. Mr. Taylor spoke of the need for further research and development of AWIPS so that the National Weather Service can have continual improvements in weather forecasting as new technology becomes available.

### **Hot Areas for Future Employment in the Private Sector**

Mr. McCarthy said robotics have replaced human deep-sea diving. Potential careers involve running and maintaining these unmanned-submersibles, and developing technology to create smaller robotic submersibles with improved guidance and imaging systems. Mr. Morgan said aquaculture, particularly involving biotechnology research, has unlimited growth potential. He named several commercial and private enterprises that are studying how to develop fish faster.

### **The Necessary Skills for Competitive Employment in the Private Sector**

All participants agreed that strong computer skills in addition to scientific research skills was vital to employment in the private sector. Mr. Taylor specified learning Oracle, C++, and Visual Basic. Both Mr. Taylor and Mr. Morgan suggested getting a minor in Computer Science; Mr. Morgan also suggested becoming familiar with basic management training and business skills.

**Specific Recommendations to Enhance the Private Sector:**

- ☐ ☐ Develop genetic technology and environmental monitoring systems for aquaculture.
- ☐ ☐ Provide research dollars to support private sector research.
- ☐ ☐ Re-use old infrastructure, adapting them to private sector or research use.

#### **D. Panel Five: *Doing Business with NOAA***

##### Moderators:

Mr. Benjamin Watkins, Chief, Satellite Service Division  
NOAA/National Environmental Satellite, Data, and Information Service  
Dr. Roman Jesien, Assistant Professor, Department of Natural Sciences  
University of Maryland Eastern Shore

##### Panel Members:

Ms. Fara Guest on *Human Resources*  
NOAA Student Employment Manager  
Mr. Steven Drescher on *Grants/Cooperative Agreements*  
NOAA Grants Management Specialist  
Ms. Barbara Booker on *Procurement*  
Chief, Acquisitions Management Division  
NOAA Eastern Administrative Support Center  
Dr. Steven Swartz on the *Client Perspective*  
Chief, Protected Resources and Biodiversity Division  
NOAA/National Marine Fisheries Service, Southeast Fisheries Science Center  
Ms. Essie Coleman-Duffie on the *Client Perspective*  
Fishery Management Specialist  
NOAA/National Marine Fisheries Service, Southeast Fisheries Science Center

This panel discussed the pragmatics involved in doing business with NOAA.

##### Guiding Questions

- ☐ What are the administrative procedures related to the following: (a) grants/cooperative agreements/MOUs; (b) human resources/employment; and (c) procurement/contracts?
- ☐ How are priorities established in the above areas and who is responsible for setting priorities?
- ☐ How does one find out about opportunities at NOAA?
- ☐ What are some of the basic requirements for doing business with NOAA?
- ☐ What level of participation has there been by HBMSCUs in NOAA's programs in the last five years?

## **Grants and Financial Assistance for Universities**

Mr. Stephen Drescher outlined the mission of his office, the NOAA Grants and Cooperative Agreements Office: To award and administer NOAA financial assistance to facilitate achieving NOAA's scientific research and resource management mission. The office awards 1,000 grants with approximately 500 awards going to universities. NOAA administers grants totaling approximately \$405 million.

The vision of the NOAA Grants Management Division (GMD) includes: develop and implement a seamless, electronic processing of grants from application to closeout; fully implement an interactive NOAA Grants website; develop partnerships with NOAA and grantee customers; assure complete compliance with the Chief Financial Act (CFO) audit requirements. The CFO audit strengthens audit requirements. All funds must be properly accounted for and work progress monitored. Improved processes for customer services abilities, and computer processes have been strengthened through the use of the NOAA web page at [www.rdc.noaa.gov/](http://www.rdc.noaa.gov/). NOAA must also comply with the paperwork elimination act passed by Congress. Through the automatic grant system, the NOAA homepage lists solicitations, provides for receiving on-line electronic clearances and processes electronic fund deposits.

In the spirit of working effectively, NOAA GMD is striving to reduce the amount of time it takes to make grant awards by improving the administrative quality of grant applications through continued client outreach and developing true partnerships with states, universities, and non-profit organizations. Dialogue with NOAA partners enhances communication, shares information and provides for alternative dispute resolution. NOAA conducts periodic workshops for recipients which enhance the quality of applications and reports by establishing dialogue and camaraderie, educating prospective applicants, and providing training on administrative and regulatory requirements for grant awards.

## **NOAA Student Employment Programs**

Ms. Guest stated that NOAA has made a commitment of 100 full-time equivalents (FTEs) to the Student Career Experience Program (SCEP), which replaced the co-op program, and she described the program's requirements. The student must be in school at least half-time at an accredited academic institution. An agreement must be set up with institutions on a case-by-case basis to participate in the Student Career Experience Program. These agreements can be made at anytime during the year and count against NOAA's FTEs. NOAA line offices must commit funds for the program through Standard Form (SF)-52s. A student can participate anytime during the year; it is no longer just for summer positions. There are no financial limitations, but U.S. citizenship is required. Those students who complete 640 hours and obtain their degrees can be converted non-competitively to a full-time position.

The Presidential Management Intern (PMI) is a graduate level program for those interested in public service. Candidates are hired at GS-9 and promoted to GS-11. Upon completion of the assignment, the candidate can be non-competitively converted to a permanent position.

These two programs are a great way to bring students into the workplace. Ms. Guest offered the following as ways, for managers, to increase the use of cooperative work assignments:

- ☐ Use local career fairs.
- ☐ Increase use of mentoring which is important for retention. This will lessen the constant turnover problem.
- ☐ Involve faculty. Exchange of faculty is key.
- ☐ Establish a cadre of experts who will give the students the necessary information to sell the mission.
- ☐ Utilize mentoring objectives.

NOAA vacancies are listed on NOAA's homepage: [www.rdc.gov](http://www.rdc.gov). Salary requirements are listed on vacancy announcements. A general web site is [www.usajobs.opm.gov](http://www.usajobs.opm.gov).

### **Acquisition Management Division**

Ms. Booker emphasized that the White House Executive Order #12928 of September 16, 1994 requires that federal personnel commit to the letter and spirit of all laws promoting participation of HBCUs and Minority-Serving Institutions (MSIs) in federal procurement. Therefore, we should seize the opportunity to use this as a vehicle for NOAA to increase access and support to HBMSCUs. Contracts, not just full-time employment, are a way for NOAA to increase diversity in its workforce. The contractors can be from HBCUs, through contracting with research faculty, from a minority-owned business, or simply minority individuals who can provide a needed and specialized skill. The Department of Commerce (DOC) issues a forecast of opportunities which helps locate these new contract markets. The new forecast includes points of contact and proposed performance periods.

NOAA spends a great deal of money on the contract side, but only a small percentage goes to HBCUs. NOAA also falls short in the percentage of funding given to minority- and women-owned businesses.

The Department of Commerce has established the SBIR (Small Business Innovative Research), a three-phase program where a percentage of dollars is set aside to award funds to small businesses for innovative research. Phase 2 allows small businesses to partner with HBCUs in scientific research and engineering. There are 10 federal agencies, including DOC, which

participate with the SBIR program. The SBIR listings include a generic listing of types of topics DOC is interested in, i.e., living marine resources, cartography and photogrammetry, and environmental factors affecting feeding, and growth of sea turtles.

The NOAA Acquisition Office plans to improve outreach. Outreach will include visiting campuses, monitoring performance, monitoring principal investigators, and allowing HBCUs access to PRO-Net, a database which allows one to search for partners on any given project.

The internet addresses and various points of contact are the following:

[www.doc.gov/oam](http://www.doc.gov/oam)

[www.doc.gov/osdbu/geninfo/about.htm](http://www.doc.gov/osdbu/geninfo/about.htm)

[www.doc.gov/oam/conops/](http://www.doc.gov/oam/conops/)

[www.sh.nmfs.gov](http://www.sh.nmfs.gov)

[www.wh.who.edu](http://www.wh.who.edu)

[www.rdc.noaa.gov/~and/sbir.html](http://www.rdc.noaa.gov/~and/sbir.html)

[www.sbaonline.gov/SBIR/Sbir.html](http://www.sbaonline.gov/SBIR/Sbir.html)

[www.pro-net.sba.gov](http://www.pro-net.sba.gov)

[www.doc.gov/ocbam/intern.htm](http://www.doc.gov/ocbam/intern.htm)

### **NMFS Office of Protected Resources**

This office keeps track of protected resources not targeted for utilization, such as marine sea turtles, marine mammals, and reef fish. This office implements three legal mandates: Magnuson Fisheries Act, Endangered Species Act, and the Marine Mammal Protection Act.

Dr. Swartz works in concert with the regional office in St. Petersburg, Florida. He reminded us that there is a price to be paid for commerce and development. The optimists think that the protection of all species can be compatible with commercial development. The office monitors the status of those marine species that have been over-harvested, reduced in numbers below sustainable levels, or that require specific habitats and thus are vulnerable to development.

The Office of Protected Resources has a need for expertise in almost all disciplines, ranging from natural history to the highest levels of mathematics. Mathematics, biology, statistical sciences, visual surveys, genetics, passive acoustics, radio and satellite tracking, and aerial surveys are all used to assess the status of marine species. The use of photographic identification, for example, utilizes individual characteristics obtained from photographs to document the presence and seasonal movements of individual whales. This information then serves as the basis for developing conceptual mathematical models to examine stock structure and population dynamics. A broad range of expertise is required; the Office looks for people with high technical skills who can understand basic scientific principles.

Dr. Swartz recommended that interested students participate in Internet discussion lists and interactive sessions. He also suggested that students join professional societies; student chapters of professional societies usually offer reduced rates. For example, professional meetings sponsored by the Society for Marine Mammalogy and the Minerals Management Service feature symposia and public information meetings. NMFS convenes periodic meetings, including workshops on careers.

## **NOAA and the Minority Community**

Ms. Essie Coleman-Duffie stated that NOAA is a service provider. Procurements, contracts, grants, human resources and personnel opportunities for minorities are all part of NOAA's service requirements. NOAA has internal as well as external users. Examples of external users include academia, other agencies, students, contractors and the like. It is important that HBCUs and Minority-Serving Colleges and Universities (MSCUs) become part of this process.

NMFS has a long history working with HBCUs. Many students have come into the organization through co-op programs. The co-op program remains the best mechanism for getting people into the pipeline and into the agency. Partnerships with elementary and middle schools are also helpful, and partnership programs should be considered with marine science high schools and magnet schools. The existing Student Educational Employment Program (SEEP) is a great opportunity to attract minority candidates and can be initiated at various levels from high school to graduate school. Faculty appointments with faculty from HBMSCUs and majority institutions also provide excellent opportunities to establish cooperative relationships and ensure participation and representation by minorities in NOAA programs.

NMFS's SEFSC has developed a working relationship with several HBCUs which include Florida A&M University, Florida Memorial College, South Carolina State University, University of Maryland Eastern Shore, Elizabeth City State University, and Winston Salem State University. It has signed MOUs with Savannah State University, Jackson State University, and the University of Puerto Rico.

It is critical to have ongoing efforts to increase the diversity of the NOAA work force. Some of these initiatives will be short-term as well as long-term efforts. There are many examples of successful collaborative partnerships, projects, and efforts: NMFS Minorities At Sea Program provides hands-on work experience and career exposure to minority students and faculty aboard NMFS research cruises; the Gulf of Mexico Minority Alliance is a consortium of HBCUs and MSCUs in the five Gulf states; the Florida Bay Outreach and Educational Project is an initiative that expands involvement of HBCUs and MSCUs into major ongoing research in the expanding South Florida Everglades Restoration Program; and the NMFS human resources internal and external grant program, which are special projects/initiatives aimed at increasing the diversity of the workforce while contributing to the overall mission of the agency.

Additionally, NOAA has worked closely with scientific organizations to provide funding and support to increase minority faculty and student participation at scientific meetings and conferences. These include the American Fishery Society (AFS), the American Society of



Limnology and Oceanography (ASLO), Minorities in Natural Resources Committee (MINRC), and Gulf Estuarine Research Society (GERS).

Tips for students and faculty interested in opportunities in NOAA include the following:

- ☐ ☐ Check the NOAA website for financial and research opportunities.
- ☐ ☐ Check vacancy announcements for available job listings.
- ☐ ☐ Check the federal register for grants. Pay close attention to deadlines timing is crucial.
- ☐ ☐ Make personal contacts.
- ☐ ☐ Utilize word of mouth.
- ☐ ☐ Attend scientific conferences and meetings and become members.
- ☐ ☐ Form partnerships with agencies and organizations.
- ☐ ☐ Participate in special programs and projects (American Indians in Science and Education Society (AISES), HACU, ORISE, Metropolitan Consortium for Minorities in Science and Engineering (METCON).
- ☐ ☐ Become a volunteer.
- ☐ ☐ Establish role models.
- ☐ ☐ Develop mentoring relationships.
- ☐ ☐ Follow up and follow through.
- ☐ ☐ Persistence! Persistence! Persistence!

Despite these efforts, minority populations are still being left out. They need to be part of the process, and NOAA needs to bring them in by partnering with academia as well as community organizations and Black churches. As more minorities become exposed to the marine and atmospheric sciences and as more minority students receive their doctorates, more established diversity will be achieved in NOAA.

## N. Concurrent Panel Sessions

### **Panel Six: *Sustained Research Funding: Opportunities at NOAA for HBCUs***

Moderators:

Dr. Livingston Marshall, Associate Professor, Department of Biological Science  
Morgan State University

Dr. Larry L. Stowe, Research Scientist  
NOAA/National Environmental Satellite, Data, and Information Service

Panel Members:

Dr. James Arrington, Vice President of Academic Affairs  
South Carolina State University

Dr. John Boreman, Deputy Director, Northeast Fisheries Science Center  
NOAA/National Marine Fisheries Service

Dr. W. Stanley Wilson, Deputy Chief Scientist  
National Oceanic and Atmospheric Administration

Dr. Paul Croft, Coordinator of the Meteorology Program  
Jackson State University

Mr. Justin Ahanhanzo, United Nations Educational, Scientific, and Cultural Organization  
(UNESCO)

This panel was charged with providing the audience with summarized information on the types of sustained research opportunities (past, present, future) at NOAA.

#### Guiding Questions

- ☐ What is the selection and funding process for Joint Institutes and Cooperative Research Programs?
- ☐ What is the role of legislators in the identification, selection, and award process?
- ☐ How do we scale the Joint Institutes and Cooperative Research Programs to include HBMSCUs?
- ☐ What is a realistic time frame within which these programs can be awarded to HBMSCUs?
- ☐ Is there a role for the private sector in establishing the Joint Institutes and Cooperative Research Programs at HBMSCUs?

## **NOAA/NESDIS s Relationship with HBMSCUs**

Dr. Stowe's presentation focused on the NOAA/NESDIS relationship with HBMSCUs, beginning with a brief introduction of NESDIS role and functions. He indicated that several of

the programs within NESDIS were planned for three to five years and often included collaborations with OAR, NMFS, Coastal Ocean Programs, and others. NESDIS's charge is to manage and operate the nation's satellites. These include two polar orbiting satellites, two Geostationary Operational Environmental Satellites (GOES), and one Defense Meteorological Satellite Program (DMSP) satellite for sharing data and meeting strategic needs of the military. NESDIS has an end-to-end responsibility to manage and operate the nation's satellites, ranging from launch to data processing and analysis. NESDIS is also very active in the educational community, participating in career fairs, supporting NOAA student programs, developing in-house full-time programs, supporting teacher programs, conducting educational conferences, supporting space grant consortium, and supporting the Clark-Atlanta University Earth Science Program. NESDIS's future goals include continued support for several educational programs, such as established and future NOAA programs, development of MOUs and establishment of Cooperative programs within NESDIS, continued support for the American Meteorological Society (AMS) Educator initiative, and continued sponsorship of Educator workshops.

Dr. Stowe also provided an overview of the University/Cooperative Institute Programs within NOAA/NESDIS. These collaborative arrangements exist for the purposes of pursuing mutually interesting and beneficial research between NESDIS and universities, and in some cases actually include the physical location of NESDIS employees at universities. Additional information on these cooperative institutes can be found on NOAA's web page.

Dr. Stowe responded specifically to the five panel questions as followings:

1. *What is the selection and finding process for Joint Institutes and Cooperative Programs?*  
NOAA is aware of Centers of Excellence; they are pursued and provide support for research. For example, other federal agencies such as NASA quite often share the cost of supporting the centers. Establish MOUs with the interested institute to provide mechanisms for research. This approach does not guarantee funding for a Cooperative Joint Institute.
2. *What is the role of legislators in the identification, selection and award process?*  
The legislative side of government is not involved.
3. *How do we scale the Joint Institutes and Cooperative Research Programs to include HBMSCUs?* One potential starting place: establish Internet short courses based on NOAA research, similar to the approach taken by the University of Wisconsin. Build upon the existing arrangements, plus establish consortium arrangements such as those between NOAA and the Atlanta University complex (Clark-Atlanta University, Spelman, Morehouse, etc.). Submit small proposals that could potentially evolve into MOUs.
4. *What is the realistic time frame within which these programs can be awarded to HBMSCUs?*  
Approximately two years: one year for proposal development, and one year for establishment of the Institute.

5. *Is there a role for the private sector in establishing the Joint Institutes and Cooperative Research Programs at HBMSCUs?* There is no private support right now. However, if private sector entities can benefit from government/university cooperative research, they may be willing to provide support.

## **National Sea Grant Review Panel**

Dr. Arrington's presentation provided information from two perspectives: the NOAA National Sea Grant Review Panel, and an HBMSCU setting. Of the 29 existing Sea Grant colleges, many have programs serving minorities. One problem is getting minority institutions involved in such programs, in spite of the fact that HBMSCUs have a wealth of knowledge and success from which to build. In recognition of this situation, NOAA Sea Grant provided five HBCUs with awards of \$150,000 over three years to enhance their capabilities in competing for Sea Grant research funds. The initial expectations of the program are: to increase exposure of students to marine science; increase the quality of students completing studies at HBMSCUs; accelerate partnerships between state and national marine programs; and to support and enhance other sea grant programs.

Five HBCUs Clark-Atlanta University, Delaware State University, Hampton University, Savannah State University and the University of Maryland Eastern Shore were selected based on their existing capabilities in areas of marine, atmospheric, and environmental sciences. These institutions are in their last year of the three-year funding period. The National Sea Grant Office has indicated that the program will be continued. Dr. Arrington recently had the opportunity to visit each of the five campuses participating in this enhancement award, and concluded that most of the five institutions have done well with the allocated funds. In some cases, some of the Principal Investigators (PIs) have been successful in leveraging program funds to enhance their institutional programs; others have been successful in focusing on their basic program needs. With all of the PIs present at the conference (along with students being supported by the program from the five respective campuses), Dr. Arrington asked that persons interested in more details should speak with the respective Principal Investigators. He also noted that a task force had recently been established to oversee and review the activities of the five HBCUs participating in the program, and echoed a call for additional persons to serve on the task force.

In a recent review of the performance of the enhancement program, the following recommendations were made to the National Sea Grant panel and National Sea Grant Office:

1. Develop a Response for Proposals (RFP) for the next comprehensive round of HBCU enhancement awards. This RFP should be available for release by early fall (around September/October 1999). Once the RFP is disseminated and proposals received, the applications will undergo a peer review process consistent with needs and interest of the program.
2. Conduct periodic meetings between PIs and State Sea Grant directors. This activity would meet the challenge of the HBCUs in reporting their progress to the state, address the much-needed improvement in communications between the two entities, and also enhance the overall collaborations of the partnership.

3. Continue to pursue additional funding to extend the base funding now provided by the enhancement program. This activity may include pursuit of additional appropriations for the Sea Grant program as well as other funding from other federal agencies (such as Department of Defense (DOD), NASA, and others).

## **Cooperative Marine Education and Research Program (CMER)**

Dr. Boreman spoke in his capacity as Deputy Director, NOAA/NMFS/NEFSC, and past Director, CMER Program, with the University of Massachusetts. He explained that the purpose of the CMER programs is to expand the range of expertise in marine science covering a variety of scientific disciplines (anthropology to zoology). Other purposes of the program are to gain access to university facilities and equipment, and to take advantage of the intellectual resources on university campuses. Originally, the primary goal of the program was to train graduate students.

The program is the brainchild of Mr. Allen Peterson, whose main goal was to raise the quality of graduate students in marine science while simultaneously providing funding to universities and training potential employees for NOAA in the future. The program has gained importance in times of shrinking budgets, addressing the need to tap into student and faculty resources. The program began in 1989 at the University of Rhode Island and the University of Massachusetts, Amherst. It expanded to Rutgers University (1993), and the last program unit was established in 1999 at Southampton College, an undergraduate institution.

The CMER programs are supported with base funding provided by the Northeast Fisheries Science Center and by additional funds from other related programs. Typically, there is a cooperative agreement between NOAA/NMFS and the university established via Memoranda of Agreement (MOA). The MOAs are not written as outright grants to the universities. NOAA/NMFS scientists play a key role in the development of CMER projects. Project ideas and initiatives originate within NOAA with emphasis on their utility and potential for involvement by graduate students. The program places NOAA personnel on campus in a field station-like arrangement. These NOAA personnel are expected to teach at the graduate level, advise students, function as members of the graduate faculty, and serve on graduate student committees. In return, the university provides the NOAA personnel with facilities, administrative support, and other related items. NOAA/NMFS spends approximately \$2-300,000 per year for each program operation. These funds contribute to the base funding needed to support the individual programs, as well as the NOAA scientist assigned to the program campus.

Dr. Boreman noted that one strength of the program is the targeted partnership between NOAA/NMFS and particular universities. However, he also noted several constraints:

1. Program support, particularly start-up funds: Each program costs \$2-\$300,000 annually to operate, which is a sizeable amount in times of continually shrinking budgets.



2. Selection of graduate students can also be problematic, especially when or if minority students are not targeted in a formal sense. A possible solution to this problem is to locate CMER units at an HBCUs.
3. Sustained relationship with universities: The long-term relationship between NOAA/NMFS and individual universities is being questioned on a number of fronts (including within NOAA). Given budget constraints and typical NOAA grant process constraints, questions

are being asked why certain universities should receive directed funding without full participation in a more open competitive processes.

4. Too many ready-made excuses not to do what is really needed to be done regarding involvement and inclusion of HBCUs in CMER type programs. There is a need to address various issues here, including selection of graduate students, dissemination of RFPs, etc.

Dr. Boreman concluded by noting that there is pressure to move the CMER program into an open solicitation process. However, this can be viewed as a catch-22. On one hand, there is an expectation to develop a program within HBCUs; on the other hand, these institutions would be expected to compete with larger, established programs, thereby lessening the chance of a HBCU being awarded a CMER program. All of these issues require frank and open discussions in order to further involve HBCUs in NOAA and NMFS funding opportunities.

### **Atmospheric Sciences**

Dr. Croft's presentation focused on issues relevant to the meteorology program at Jackson State University and other NOAA related activities. He pointed to the problem: a lack of diversity in the atmospheric sciences at the professional, graduate, and undergraduate levels. He discussed various approaches to address this problem. In order to fully grasp the likelihood for success in addressing diversity issues, the components of success need to be defined. These components are a combination of recruitment, retention, education/training, and research effort. Some of the efforts shown to be effective include mentoring and involving students in various academic and professional activities. Hurdles to achieving success include: lack of adequate time provided for faculty involvement in such programs by the university; lack of physical and human resources to support activities; difficulty in maintaining long-term involvement of good students in activities and programs; and the small number of students impacted by programs. The maturity and independence of students in the program, as well as educational dilemma (technological advances and accompanying tools) and pedagogy (e.g., converting to electronic classrooms and use of other multimedia tools), were also noted to have adverse effects on potential program success.

Dr. Croft offered the following as potential solutions to the above problems and issues: pre-college initiatives; full-time mentoring; long-term sustained funding; full-time student internships (avoid interrupt and disconnects); and provision of support resources. The benefits of these approaches include increases in the numbers of minority students successfully completing degrees in the atmospheric sciences, and thus an increase in the numbers pursuing graduate degrees; research deliverables; and sustained research and academic programs. The timeframe to establish all of the above would be approximately five years to achieve program objectives and see the full impact of those efforts. The first two years would mainly involve set-up of the program and demonstration of the program's initial effects.

Dr. Croft proposed that a Joint Institutional and Cooperative Program be established with partnership arrangements and involvement of federal agencies, HBCUs, the larger academic and research universities, the private sector, and the technical and virtual community. This program would include base funding for student internships, provide a satellite center for research activities, and focus on important diversity issues as they relate to involvement of minorities in the atmospheric sciences. Without community-building at all levels in particular for undergraduates and appropriate socialization into the atmospheric science community, greater diversity will not be achieved.

### **Funding Sources within NOAA**

Dr. Stan Wilson focused on potential sources of funding within NOAA:

1. Joint Institutes. These started small and have grown over time. These are typically co-located with NOAA laboratories. Over \$30 million per year is spent at the Joint Institutes, with the funds coming from NOAA as well as other entities. Primary NOAA funding sources are the Office of Global Programs (OGP), Oceans and Atmospheric Research (OAR), and NESDIS. It is possible that HBCUs might affiliate with an existing Joint Institute. The feasibility of this idea should be explored. Dr. Wilson volunteered himself as a conduit for this initiative and indicated his willingness to work with any interested parties.
2. Sea Grant. Approximately \$52 million is provided by Sea Grant to universities with a two-to-one match: for every two dollars Sea Grant provides, the university must raise an additional dollar. Only a small percentage of Sea Grant funds go to HBCUs. He also noted that Dr. Arrington's example of the NOAA's Sea Grant effort to work directly with five HBCUs was an excellent initiative that NOAA should consider pursuing with HBCUs. This is an example of an area in which there is a strong need to expand the current NOAA and HBCU interactions and partnerships.
3. NOS Centers for Sponsored Coastal Ocean Research. These are funded via an \$18 million competitive grant program. However, it should be noted that these programs have involved only small participation for HBCUs. There is a GLOBEC solicitation currently in circulation which HBCUs may wish to examine for possible involvement.
4. Office of Global Programs. Approximately \$67 million per year is spent to support this program. Of this amount, about half is spent in academic institutions. The next solicitation (May 2000) is expected to have a variety of program elements to be addressed by universities including HBCUs. There is also expectation that at least one other federal agency (NASA) will issue a similar solicitation.

In his capacity as NOAA Deputy Chief Scientist, Dr. Wilson is currently working on several initiatives which may hold future opportunities for HBCUs. These include planning for and development of an Integrated Ocean Observing System, working via the National Ocean Partnership Program (NOPP). Dr. Wilson provided his email address ([stan.wilson@noaa.gov](mailto:stan.wilson@noaa.gov))

and reiterated the views of DOC Deputy Secretary Mallet that there is much to be done in terms of enhancing the partnership between NOAA and HBMSCUs. He again expressed his willingness to serve as a facilitator in linking HBMSCUs with NOAA.

## **The Intergovernmental Oceanographic Commission of the United Nations Educational Scientific and Cultural Organization (IOC/UNESCO) and Capacity-Building in Marine Sciences**

Mr. Justin Ahanhanzo, Consultant and Assistant to the IOC/UNESCO Executive Secretary for implementation of the IOC activities in Africa, responded positively to a special invitation to sit on the panel. His brief address to the conference focussed on global ocean issues, particularly the role and activities of IOC/UNESCO, and on the two major initiatives undertaken by the African continent during the 1998 International Year of the Ocean: The Pan-African Conference on Sustainable Integrated Coastal Management (PACSICOM) and the African Ocean Days (AOD'98).

IOC/UNESCO coordinates extensive global oceanic research programs, among which are Global Ocean Observing System (GOOS), Marine Pollution Research and Monitoring, Ocean Science in Relation to Living and Non-Living Marine Resources (OSLR & OSNLR) and the International Ocean Data Exchange (IODE). A complete list can be found on the IOC/UNESCO web page (<http://www.unesco.org/ioc>).

The AOD'98 and PACSICOM conferences were convened to provide greater impetus to the management of seas and coasts in Africa. It brought together senior officials from all over Africa, as well as from international agencies, non-governmental organizations and bilateral financial institutions. The Chairman of the present conference, Expanding Opportunities in Oceanic and Atmospheric Sciences, Dr. Ambrose Jearld, Jr., was a member of the U.S. delegation to the PACSICOM Conference. These conferences offered a unique opportunity for discussing the state of the coastal and marine environment in Africa, with special focus on the need for concerted intergovernmental dialogue.

In particular, the PACSICOM Conference provided a framework to assess and review the efforts and experiences in Sustainable Integrated Coastal Management (SICOM) in Africa over the last two decades; to strengthen sustainable development in coastal zones and areas otherwise affected by marine processes in Africa; to raise awareness about the urgent need for well-coordinated global actions, and to help establish a strategic and integrated plan of action for the coastal management of Africa.

Finally, Mr. Ahanhanzo stressed the need to be globally aware, to see opportunities for expanding diversity in the marine and oceanic sciences within the global community. UNESCO and NOAA can cooperate towards capacity-building in Africa through research and teaching of marine and environmental sciences in the universities. He listed three specific contacts through UNESCO Chairs for capacity-building: UNESCO Chair in Sciences, Technologies and

Environment at the National University of Benin, Campus of Abomey-Calavi; UNESCO Chair in Coastal Integrated Management at the University Cheick Anta Diop of Dakar, Senegal; UNESCO Chair in Marine Sciences and Oceanographic Issues at the University Eduardo Mondlane of Maputo, Mozambique.

### **Additional Opportunities**

Dr. Marshall pointed out that in addition to the information presented by the panelists, there were other NOAA-related programs not discussed in detail in the session which constituted programs that the audience should be aware of and explore. For instance, the Office of Global Programs (OGP) has a partnership in which universities share in more than half of the funding.

Additionally, under the reorganization of the National Ocean Sciences (NOS), centers for coastal ocean science have been established. Some of these science centers were former OAR, NMFS and Coastal Ocean Programs (COP) and facilities. NOS is looking to broaden the scope of the lab research, and hopes to bring managers and scientists together. These two initiatives as well as the information presented in the discussions describe opportunities for partnerships between NOAA and HBMSCUs.

## **Panel Seven: *Student Networking and Discussion***

### **Moderators:**

Dr. Kelly Mack, Assistant Professor, Department of Natural Sciences  
University of Maryland Eastern Shore  
Jan Kucklick, Coastal Management Specialist  
NOAA/National Ocean Service

### **Panel Members:**

Dionne L. Hoskins, PhD Candidate, Marine Science Program  
University of South Carolina  
Andrea Rocha, Junior, Marine Biology  
Texas A&M, Corpus Christi  
Maronda Brown, PhD Candidate, Molecular and Cell Biology  
University of Connecticut  
Dr. George B. Brooks, Aquatic Scientist and Environmental Planner  
University of Arizona

This panel focused on how students got to and stayed in graduate school.

### **Guiding Questions**

- ☐ Which of the educational, employment and funding opportunities discussed during the conference are of interest to me?
- ☐ How should I prepare myself to take advantage of these opportunities in the oceanic/marine, environmental, and atmospheric professions?
- ☐ What types of skills are required to compete for these opportunities?
- ☐ What can I learn from other students about improving my skills?
- ☐ How do I make the transition from (a) undergraduate to graduate school;  
(b) a HBMSCU to a Traditionally White Institution (TWI)?
- ☐ Are there fundamental issues that I need to address in order for me to be successful?
- ☐ What do successful people have in common?

## **Important Factors for Getting into Graduate School**

Panelists listed a number of different strategies to prepare for graduate school:

1. Learn how to learn.
2. Learn from other students.
3. Attend conferences to network.
4. Make professional contacts.
5. Get good grades and GRE scores.
6. Demonstrate maturity, research experience, and interdisciplinary strengths.
7. Take advantage of REUs.
8. Use as a guide the first Expanding Opportunities Report on Student Concerns held in 1995 at Hampton University.

### **Important Factors for Staying in Graduate School**

Panelists all emphasized the need for an advocate, someone who will mentor and promote students. They also mentioned that students need to be aggressive, to develop a culture of success, and a network of peer and administrative support. Students should investigate their potential advisor's research record and the success of their former students as an indicator of their ability to mentor or assist graduate students effectively. They advocated that students stay in touch with their mentors, learn to use all support systems, and develop excellent communication skills. There was general agreement that students use internships/fellowships during or after school to help strengthen their experience and professional development as well as to help build networks/contacts.

Panelists and participants all agreed that consistent financial support is critical for a student to complete a graduate degree successfully. This factor can not be underestimated in how influential money worries are on the success one achieves in his or her course work, research, and overall participation in relationship to peers and mentors.

### **Specific Recommendations:**

- ☐ Consistent and adequate financial support.
- ☐ Faculty mentorship.
- ☐ Support Groups; especially peer support.



**B. Panel Eight: *Building and Expanding Sustainable Alliances  
Between HBMSCUs and NOAA***

**Moderators:**

Dr. Sharon H. Walker, Program Director for Education  
National Sea Grant College Program  
NOAA/Office of Atmospheric Research

Dr. Reginald Lawrence, Physical Scientist  
NOAA/National Environmental Satellite, Data, and Information Service

**Reporters:**

Dr. Benjamin Cuker, Associate Professor of Marine Science  
Hampton University

Dr. Denise Stephenson-Hawk, Chair, Department of Physics  
Clark-Atlanta University  
Member, NOAA Science Advisory Board

Dr. Matt Gilligan, Director, Marine Science Laboratory  
Savannah State University

Dr. Roman Jesien, Assistant Professor, Department of Natural Sciences  
University of Maryland Eastern Shore

Dr. Livingston S. Marshall, Associate Professor  
Morgan State University

Mr. Paul S. Trotter, Meteorologist  
NOAA/National Weather Service

Mr. Benjamin Watkins  
Chief, Satellite Services Division  
NOAA/National Environmental Satellite, Data, and Information Service

This panel reported on the recommendations that emerged from panels and the working groups. It gave all the conference participants a chance to reflect on what had taken place at the conference and to pool their information. In this report, these discussions are included in the specific panel and working group presentations as well as the overall recommendation section.

**Guiding Questions**

- ☐ What are the recommendations from the conference's working groups?
- ☐ What actions are required and agreed on?
- ☐ How will we follow-up on the recommendations and commitments?

## VII. WORKING GROUPS

### Assessment and Review of NOAA s and Academic Institutions Education and Research Programs

Each working group focused on a different aspect of NOAA s and HBMSCUs programs. They sought to address, within that area, the following questions:

#### Guiding Questions

- ☐ What is the current capacity of HBMSCUs and NOAA to increase access to educational and employment opportunities for minorities in the oceanic/marine, environmental, and atmospheric professions?
- ☐ How can the resources of HBMSCUs and NOAA be leveraged in order to expand and sustain the capacity of both organizations to increase minority participation at all levels?
- ☐ What academic fields/disciplines at HBMSCUs have the potential to enhance NOAA s mission, but remain untapped?
- ☐ How can HBMSCUs and NOAA work together to ensure that minorities have full access to education and employment opportunities in higher education, government, and private industry?

#### A. Working Group: *Atmospheric*

##### Consensus

The public must be informed of and educated about NOAA s science programs and initiatives. NOAA must actually market itself, publicizing what it has done and what it needs to continue expanding diversity within its line offices.

But words are not enough. NOAA must make sure that its diversity issues take action and follow the letter of the law. The important work of changing the culture at NOAA must be done in step with public law to ensure fairness and accountability.

**Responses to the Keynote Address:**

- ☐ Advocate and agitate as taxpaying constituents for congressional coordination.
- ☐ HBMSCUs must demonstrate commitment and find state/local/community funding.
- ☐ HBMSCUs must demonstrate stewardship and accountability relative to funds.
- ☐ HBMSCUs must be willing to be mentored by larger, more fiscally successful universities.

### **Responses to NOAA s Strategic Plans:**

- ☐ Create and disseminate reliable assessments and predictions of weather, climate, space environment, marine resources, nautical, aeronautical, and geodetic phenomena.
- ☐ Implement integrated approaches to environmental management and ocean and coastal resources development for economic health.
- ☐ Ensure continuous operational observing capabilities from satellites to ships to radar.
- ☐ Build and use new information networks.
- ☐ Develop public-private and international partnerships, and expansion and transfer of environmental knowledge and technologies.
- ☐ Invest in scientific research and the development of new technologies to improve current operations and prepare for the future.
- ☐ Improve NOAA s abilities to serve customers and forge stronger ties with its partners and stakeholders.

### **Responses to Concerns**

Current programs do exist, including ORISE (Oak Ridge Institute for Science and Education), (Practical Hands-On Application to Science Education (PHASE), and SCEP. However, not enough money is available to run these programs. NOAA needs to commit and plan for long-term partnership and long-run benefit.

HBMSCUs should develop affiliations that include partnerships with the larger successful institutions that have long-term commitments in place, such as Cooperative Operational Meteorological Education and Training (COMET)/University Corporation for Atmospheric Research (UCAR)/National Center for Atmospheric Research (NCAR). NOAA needs to use the Internet to advertise resources and tools. Look at programs that work and consider bringing back the Graduate Scientist Program or similar programs. Look at partnering with outside private sources and other countries within Africa, Asia, Central and South American (World Meteorological Organization [WMO]) for examples of win-win situations.

Most, if not all, HBMSCUs have excellent mathematics, computer science, physics, engineering, business, biology, and chemistry programs ready and able to serve students. HBMSCUs can also offer continuing education for current employees to enhance their skills.

A national clearinghouse is needed to list all programs. In addition to placing information on the Internet, human connections are still needed to respond to questions.

### **Atmospheric Working Group Recommendations:**

- ☐ ☐ Create a centralized clearinghouse for NOAA backed up by real people .
- ☐ ☐ Form partnerships between minority and majority schools.
- ☐ ☐ Make programs of financial assistance to include competitive, multi-year grants available to HBMSCUs.
- ☐ ☐ Implement best practices based upon successful programs.
- ☐ ☐ Sensitize NOAA on the need for diversity.
- ☐ ☐ Use HBMSCU graduates already employed at NOAA and DOC to network and assist with recruitment of greater numbers of minorities to increase their numbers hired across DOC.
- ☐ ☐ Have HBMSCUs serve as continuing research and education partners.

## **B. Working Group: *Oceanic and Marine***

### **Consensus**

1. Of greatest importance is to establish NOAA line office program links with HBMSCUs capabilities.
2. A dedicated central web page designed to provide a forum to promote diversity in the sciences could form the nucleus of an extended network to exchange information and to make contacts. The web page must be updated regularly showing the progress of efforts and activities.
3. Recommendations should not be restricted to HBMSCUs. Since many majority institutions have made significant contributions to increasing diversity in the marine and atmospheric sciences, there is no reason for excluding them.

### **Oceanic and Marine Working Group Recommendations:**

- ☐ Promote expanded use of co-op agreements at both the graduate and undergraduate level.
- ☐ Encourage and reward NOAA researchers for adjunct faculty appointments at HBCUs.
- ☐ Review procurement procedures with the intent to increase contract awards with HBMSCUs.
- ☐ Establish HBCU Sea Grant Colleges.
- ☐ Seek HBMSCUs to partner in Joint Institutes.
- ☐ Establish consistent policies among the NOAA line offices.
- ☐ Provide sufficient entry level positions to undertake a coordinated and comprehensive effort to recruit, retain and develop minorities.
- ☐ NOAA must invest in year-round on-site marketing and recruitment if it is to compete for the best and brightest.
- ☐ Improve retention through mentoring and following up with on-the-job support for new minority recruits.
- ☐ HBMSCUs must encourage multidisciplinary and interdisciplinary collaboration on campuses to help meet NOAA's growing needs in areas such as resource economics, social sciences, and experts in fishery population dynamics.
- ☐ Establish policies to ensure that NOAA contract and subcontract hires include recruits from HBMSCUs.
- ☐ HBMSCUs must promote curricula and curriculum development in areas of expertise needed by NOAA.
- ☐ Improve the flow of information and communication between NOAA and HBMSCUs.

### **C. Working Group: *Coastal and Limnological***

#### **Consensus**

Widespread awareness of existing and potential partnerships is absolutely vital. A central listing of partnerships, programs and initiatives must be developed. We must be flexible when thinking of potential partnerships kindergarten through graduate schools, private and public sectors, full-time employees and contract workers, majority and minority institutions, museums and industry. Only if we are open-minded ourselves about who can help us, can true diversity be promoted.

A central listing of partnerships, programs and initiatives should be carried on the web page, as well as in more traditional outlets.

### **Focus on Coastal Zone Management**

The Coastal/Limnological Working Group chose to focus on interactions between HBMSCUs and NOAA in the area of Coastal Zone Management. That focus was chosen because many of the HBMSCUs are located in coastal areas and have a tradition of strong programs which are relevant to this particular issue: basic science, sociology, history, planning, and policy. In terms of special attention for follow-up endeavors, most participants agreed with a suggestion that Chesapeake Bay be selected first, with University of Maryland Eastern Shore, Morgan State University and Hampton University serving as lead institutions, but these interactions should involve other HBMSCUs.

### **HBMSCU s Potential for Partnership**

The group noted that HBMSCUs bring many important resources, including basic science training, students open to new ideas, historic strength in the social sciences, access to business schools, and emerging environmental policy programs to potential partnerships. Some HBMSCUs, such as University of Maryland Eastern Shore, Hampton University and Savannah State University, also have established marine science programs ready for truly active, participatory partnerships, which could engage programs in other HBMSCUs. Many of the other HBMSCUs have strong programs in physics, engineering, economics, nutrition, chemistry, and computer science that could greatly enhance the partnerships with NOAA. For instance, Tribal colleges strong emphases on natural resources have been untapped.

### **NOAA Potentials for Partnership**

NOAA could bring a variety of resources to partnerships, including an increase in their cooperative research and extension activities and associated grant programs administered by the various line offices; their extensive on-line computer capacities, assignments for both faculty and NOAA personnel through Intergovernmental Personnel Act (IPA) assignments, defined needs for scientific work to be undertaken, established student internships, available technology and ships, focused research laboratories with their recognized staffs, and jobs with NOAA for students.

### **Third Party Potentials for Partnership**

In addition to HBMSCUs and NOAA, several third partners were proposed. These include major research universities, other federal agencies such as NSF, state and local agencies, Tribal governments, non-governmental organizations, other private sector groups to include scientific, technical and other professional organizations, HBMSCU alumni, special governmental industry combinations, web links to opportunities, shadowing programs for students, aquaria, museums, co-op units, CMER, ties to K-12 education, and minority, scientific and technical societies.

### **Coastal and Limnological Working Group s Other Recommendations:**

In addition to creating a NOAA-HBMSCU partnership for study of Chesapeake Bay, other concrete steps were advocated. These include a dedicated web site with detailed information from both NOAA and HBMSCUs that lists job and internship opportunities, cooperative agreement opportunities, grants and contract announcements, and other programs of mutual concern. Participants concurred that a single point of contact or liaison office for NOAA to deal with minority issues, both from the program-related perspective and the human resource related perspective, would be of mutual benefit to NOAA and HBMSCUs.

- ☐ Sustained funding is necessary for program continuity.
- ☐ Implement the recommendation to establish a HBCU Chesapeake Bay Consortium, and a Clark-Atlanta/Atlanta Universities and Colleges and Jackson State University Consortium.
- ☐ Establish CMER programs on HBCU campuses.
- ☐ The five HBCUs with fiscal support from Sea Grant should take proactive steps in leveraging funds in the upcoming Sea Grant proposal process.
- ☐ Establish partnerships with Tribal schools and communities.
- ☐ Know and dovetail with existing programs in the Chesapeake Bay area to avoid duplication.
- ☐ Develop two to three proposals or white papers to outline strategies for accomplishment of outlined objectives.
- ☐ Provide the email address of all conference participants in the proceedings.
- ☐ Look for international opportunities such as through the U.S./South African Education Partnership and IOC/UNESCO.





## VIII. POSTER SESSION

The poster session afforded conference attendees an important opportunity to present, exchange and discuss information of a technical nature presented in a simple, concise and graphic manner within limited time and space. Abstracts and handouts were available for conference attendees to take with them. Poster presenters had the advantage of professional interaction and immediate responses to their presentations. There were 52 poster presentations in total. About half of these posters and exhibits were from NOAA participants and represented overviews of programs and research in NOAA. The remaining posters were from student participants, both graduate and undergraduate, whose displays were available for judging.

Student displays encompassed a wide range of professionally prepared posters. Work ranged from testing hypotheses through laboratory experimentation to observations and research conducted in the field. The judges divided the groups into two categories: Environmental Science and Fisheries/Marine/Oceanic Science. First and second place winners of student poster presentations were selected in each category and received cash awards of \$250 and \$150, respectively. The judging process was both difficult and stimulating. The winners and the judging panel are listed here; for a complete list of poster presentations, see Appendix H.

### Poster Presentation Winners

#### Environmental Science

First Prize: Influence of EDTA on Lead Accumulation in Two Weed Species,  
*Sesbania* and *Ipomoea*, in Hydroponic Culture  
Presenter: Susmita Ghosh  
Co-author: Charles Rhyne  
Jackson State University, Jackson, MS  
Second Prize: The Effects of Tetrachloroethylene on the Early Life Stages  
of the Japanese Medaka (*Oryzias latipes*)  
Presenter: Hattie Spencer  
Co-author: Wedad R. Hussein  
Jackson State University, Jackson, MS

#### Fisheries/Marine/Oceanic Sciences

First Prize Methodology for the Generation of Polymorphic Molecular Tags  
in the Bay Scallop, *Argopecten irradians*  
Presenter: Maronda Brown  
Co-authors: Jeff Southworth, Sheila Stiles and Linda Strausbaugh  
University of Connecticut, Storrs, CT

Second Prize: Reproduction and Juvenile Production of the Eastern White River Crayfish  
*Procambarus acutus* as influenced by Temperature and Photoperiod

Presenter: Bradley McAbee

Co-authors: William H. Daniels, Dorene L. Petrosky, and Grant Blank  
Delaware State University, Dover, DE

Judges

Dr. Carolyn Brown

Ms. Donna Johnson

Dr. Mack Felton

Mr. Harold Foster

Mr. Dennis Hansford

Dr. Sheila Stiles

## **IX. CLOSING REMARKS: *Promises Yet to Keep***

Dr. Andrew Rosenberg, Deputy Assistant Administrator for Fisheries  
NOAA/NMFS

Dr. Ambrose Jearld, Jr., thanked all those who made the conference possible, and then graciously turned the stage over to Dr. Andrew Rosenberg, who gave the closing remarks.

Dr. Rosenberg emphasized what NOAA could and could not do. He urged everyone involved in the diversity process to make their concerns known to Congress, but he reminded participants that NOAA, as a federal agency, cannot lobby and we cannot tell you to lobby. What we can do is to provide you information should you want to inform members of Congress . . . and we can respond to questions from members of Congress.

Dr. Rosenberg stressed that NOAA professionals need to be recognized for research and teaching roles within HBMSCUs, and he pledged to make this a priority within NMFS. Many NOAA employees are alumni of HBMSCUs, and we must allow opportunities for HBMSCU alumni to return and actively participate in mentoring. Even more, he promised to make sure that anyone who wants to participate in the mentoring program will be given an opportunity.

Likewise, NMFS will ensure that opportunities exist for HBMSCU faculty and students to work at NMFS facilities. Student opportunities, he said, will not be limited to fisheries but opened in all areas. Funding cannot be a barrier for co-op and summer students and faculty.

He agreed with the many participants who urged that a web site be developed to follow up on the suggestions made from this conference. He closed by suggesting a number of ways recruitment efforts could be made more effective, including CMER and co-op agreements, retention support, and structuring grants and contracts to include HBMSCUs.

## **X. RECOMMENDATIONS**

At the first *Expanding Opportunities in Oceanic and Atmospheric* Conference held in June of 1995, the recommendations focused on creating links between NOAA and HBMSCUs. While some of these recommendations have been put in place and others are still waiting to be enacted, it is useful to look at how the focus of the recommendations has changed following the second conference. In addition to the specific recommendations targeted to the academic and government sectors, there are seven overriding recommendations that emphasize the need to consider increasing diversity as a long-term, institutional and societal issue requiring systemic change and flexible thinking.

The seven overriding recommendations are as follows:

### **1. Recognize and emphasize the moral agency behind increased diversity.**

Education rates for minorities have remained stagnant for twenty-five years even as the percentage of minorities in the total population has increased steadily. Education levels are directly linked with income. Increasing diversity in the oceanic and atmospheric sciences increases the quality of life among minorities. It has larger effects as well; increased diversity more accurately reflects the nation's population, it taps into the nation's potential, and it provides genuine support for democracy.

### **2. Implement systemic and long-term change.**

True diversity cannot be achieved through short-term, individual progress. It requires entire systems to change, and to change for the long haul. There are three specific areas that need systemic change:

1. Infrastructure at the corporate, government, and academic levels.
  - ☐ Government agencies such as NOAA need to provide opportunities beyond summer programs and internships, such as internships that turn into full-time employment upon graduation and higher-level openings for scientists. NOAA must maintain up-to-date research technology to attract minorities who might go to the private sector.
  - ☐ Corporations must, when developing business alliances with NOAA, consider how these alliances create and sustain diversity.
  - ☐ HBMSCUs must develop and maintain top-notch research facilities.
  - ☐ Government, corporate, and academic sectors alike must have minorities at all levels of decision-making.
2. Cultural change.

It is difficult, if not impossible, to attract and retain minorities if their working environment is inimical or insensitive. NOAA needs to take an honest look at its cultural climate, working particularly to overcome unconscious or tacit expectations that

minorities will adapt to the dominate culture. Promoting an atmosphere that honors diversity goes beyond simply adding minority employees.

3. Financial change.

Federal monies need to be allocated to HBMSCUs to develop and sustain quality research institutions that can train quality scientists. Programs to attract and maintain minority employees that NOAA and the corporate sector develop must be given adequate and long-range funding.

**3. Create flexible approaches to attract and retain minorities.**

NOAA needs to understand an expanded and public sense of its projects. For instance, NOAA might draw from computer science undergraduate and graduate students to work on its robotic projects and to publicize NOAA s work through the Internet. English majors may be interested in writing for various NOAA publications. In short, NOAA needs to market itself, to show the range of its accomplishments from its environmental work to its submersible diving units (seen in the movie *Titanic*).

**4. More emphasis needs to be placed on PhD research at HBMSCUs.**

There are already a number of programs for K-12 designed to introduce students to the career opportunities within the oceanic and atmospheric sciences. The first conference suggested a number of ways to support minority undergraduates in their choices of science and engineering fields. Now there must be an emphasis on minority PhDs working within the oceanic and atmospheric sciences. This can be achieved by finding sustained funding for graduate research programs at HBMSCUs, keeping top-notch research facilities at NOAA agencies, and exchanging HBMSCUs graduate faculty and NOAA research scientists to keep both parties current with academia and NOAA research.

**5. HBMSCUs must have a political presence in Washington, D.C.**

HBMSCUs must educate Congress as to the value and importance of increasing diversity within NOAA. Little can be done on a national level without sustained federal support and funding. A larger political presence can guide HBMSCUs in two ways: by insisting that the issue of diversity is a national one and by demanding that NOAA be accountable for its financial spending and policy actions. Finally, a national level task force must be created to keep at the forefront the issue of diversity in the marine, oceanic and atmospheric sciences.

**6. Partnerships must be mutual, equal in responsibility, and must involve three-way links between the private, academic, and government sectors.**

Corporations, NOAA, and HBMSCUs must play equal roles in whatever partnerships are established. For instance, the hiring of minority PhD scientists must be sustained by continued development of top-notch research facilities at HBMSCUs. These partnerships should be mutually beneficial and mutually responsible in creating a diverse workplace culture. For instance, the growing field of aquaculture is ideally suited for three-way partnerships: NOAA scientists consulting at for-profit fish farms in exchange for data, students working as research interns and liaisons between NOAA and for-profit corporations.

## **7. Create a paradigm shift.**

Over the past ten to fifteen years, special programs and efforts by NOAA and its partners, including other agencies, universities, and scientific societies, have made a significant impact on increasing the number of individuals from underrepresented groups who have been trained and are pursuing careers in aquatic, environmental, atmospheric and fisheries sciences. This success is evident in relation to the number of people entering these career prior to such efforts; however, in relation to the total number of people that exist in NOAA, its partners and especially in the colleges and universities from which NOAA staff has traditionally come, the number is still small and has not reached the self-sustaining critical mass.

What needs to happen is a shift in the paradigm of employment, and there are historical precedents for mechanisms by which a new, permanent pool of quality minority talent can be established. For instance, after WWII skilled employment in the oceanography field rose significantly following a large infusion of support from the Defense Department, and resulting in the Joint Oceanographic Institutions. We need to apply these successful historical strategies to change the national culture and create a sustainable group of talented and diverse people for the oceanic and atmospheric sciences.

## **Specific Recommendations Proposed by the Working Groups and Panel Sessions.**

### **For NOAA:**

- ☐ Coordinate, on a national level, all of NOAA's opportunities for minorities by creating an electronic national clearinghouse for program information with staffing to insure response to questions, concerns, and requests for information.
- ☐ Find competitive and centralized multi-year funding.
- ☐ Tap into the strong history of African-American faith by creating links between Black churches and NOAA. Follow the model set up by the American Association for the Advancement of Science (AAAS) and the Black Church and Faith Communities Initiative.



- ☐ Remember that diversity efforts can occur in a variety of ways, not just through full-time employment, but by hiring minority contractors and supporting minority-owned businesses for the procurement of goods and services.
- ☐ Implement the best practices that link minority students with NOAA. Keep assessing programs, making sure they are properly funded to ensure maximum success.
- ☐ Be aware of legal ramifications and legislative efforts. Evaluate the use of science language around diversity versus the use of legal language from the EEO/Diversity Initiative. Note that the most positive changes have come as the result of legal action.
- ☐ Market NOAA to a wider and younger audience.
- ☐ Create new programs of study (e.g. Coastal Zone Management) at HBMSCUs that address issues specific to NOAA and draw upon a number of already strong fields, such as history, basic science, public planning and policy and sociology.
- ☐ Establish partnerships with Tribal Colleges.
- ☐ Take advantage of the current favorable NOAA climate.
- ☐ Form Joint Institutes two potential projects in aquatic and atmospheric sciences.
- ☐ Establish an organizational structure to oversee the implementation of recommendations.
- ☐ Provide immediate support for NOAA/HBCU Education Partnership Initiative.
- ☐ Encourage and support mechanisms for NOAA staff researchers to become adjunct faculty at HBMSCUs, using the Intergovernmental Personnel Act.
- ☐ Promote the use of cooperative agreements with HBMSCUs by sharing information and assisting in establishing them.
- ☐ Modify NOAA procurement procedures to permit direction of contracts to HBMSCUs.
- ☐ Identify key persons at HBMSCUs with which to interact in targeted recruiting efforts.
- ☐ Provide a sufficient number of entry-level positions at lower grade levels.
- ☐ Establish NOAA-level policy to have consistent goals and expectations across line offices.
- ☐ Improve retention by mentoring and follow-up of new minority recruits.
- ☐ Establish policies to ensure that contractors reflect NOAA's resolve for diversity and assist them in establishing links with HBMSCUs.

**For HBMSCUs:**

- ☐ Promote curricula development in areas recognized as NOAA growth areas.
- ☐ Encourage interdisciplinary collaboration on campuses to help meet needs in stock assessment, economics/social sciences, and fishery observer training.
- ☐ Develop a national K-12 program to get students interested in marine and atmospheric sciences.
- ☐ Develop a strong Washington presence to lobby for increased federal funding. Become more pro-active in obtaining funding and Congressional support.
- ☐ Use larger majority institutions as mentors, learning from them how to obtain and utilize larger grants of federal funding.

- ☐ ☐ Create cooperative programs with majority institutions and NOAA.
- ☐ ☐ Keep research facilities and faculty excellent so as to attract both students and funding.

**For the Third Conference:**

- ☐ ☐ Have a workshop on retention and recruitment.
  - ☐ ☐ Invite students who have been to the two previous conferences to speak on their experiences.
- I.

## **XI. AFTERWORD: *The Need for Institutional Change***

The excitement generated by the conference cannot be underestimated. We hope these proceedings reflect the piercing message to bring about radical change. Change not just for NOAA but for the entire populace—our academic, business, and government communities. In the months following the conference, discussion has continued, change has taken place, and new recommendations have been made. This would not have occurred without the momentum built by the conference. In light of this, it seems important, at this time, to reflect on the issues and actions that have taken place since the conference and to stress, once again, the urgency we feel in effecting diversity within the oceanic and atmospheric sciences.

Fourteen individuals (Ambrose Jearld, NOAA NMFS; Emorcia Hill, Abt Associates; Robert Stockman, DOC Budget Office; Eddie L. Whitehead, NOAA NWS; Paul S. Trotter, NOAA NWS; Mildred Ofosu, Delaware State University; Percy Robinson, DOC Office of General Council; Maurice K. Crawford, NOAA NOS; Denise Stephenson-Hawk, Provost, Spelman College; Joseph M. Okoh, UMES; Sheila Stiles, NOAA NMFS; Benjamin Watkins, NESDIS; Livingston S. Marshall, Morgan State University; and Justin Ahanhanzo, IOC UNESCO) met prior to and immediately following the formal adjourning of the conference. The group met to discuss what transpired during the conference with particular attention to the concerns and recommendations of participants. The group was concerned with how to keep the momentum of the conference going, what actions to take, and what medium would be most expeditious in seeing that these recommendations were delivered to the decision makers in NOAA or the Commerce Department for implementation.

There was consensus among the group that the Post-Conference Implementation Committee's primary goal is to increase the number of minority individuals who participate, educationally and occupationally, at all levels in the atmospheric, oceanic/marine and environmental sciences throughout the government and private sectors. Consequently, the group decided that all actions must be directed at achieving this goal. Three short-term actions towards this larger goal were outlined.

First, the group recognized that traditionally federal agencies have directed their attention and resources to students, primarily at their undergraduate level of study, believing that in doing so they have met their commitment to diversity. However, the group emphasized that attention must be brought to the compelling issue of infrastructure and capacity-building within the HBMSCUs. Strong programs and adequate resources are essential to win research dollars and to attract students and faculty. While the universities, students, and faculty are the short-term beneficiaries of this infrastructure building, the nation benefits overall.

Second, the group advocated for developing a fact sheet which describes the problems and concerns surrounding minority participation in the atmospheric, oceanic, and marine sciences in the complex public/private institutional settings that are active in these fields. A statement about why this issue is a national imperative should be included. This document would outline issues in a concise manner for NOAA and other government institutions, HBMSCUs and other educational institutions, industry, and Congressional Representatives.

Third, the group stressed that all proposals generated from the conference should be both specific and realistic in order to continue momentum and support. Every proposal should clearly specify its short-, intermediate-, and long-term objectives and should be developed around well- focused themes that link to key programs in NOAA s missions. This focus and specificity will help expedite approval and execution of proposals. Moreover, the focus should not be limited to the goal of producing higher qualified minority graduates without regard for employment opportunities. Rather, the context should include paths and linkages to cover development, at least at the entry level of employment.

In short, the Post-Conference Implementation Committee urged that focus be kept on the conference s central theme: Too Few to Count. Although the number of minorities has increased within the oceanic and atmospheric sciences, minority representation is not presently at levels significant enough to sustain a network of fiscal, professional, and educational support. To achieve true, sustainable diversity, all actions must be targeted to developing full representation for minorities not just within every level of the educational and occupational fields of the oceanic and atmospheric sciences, but also in numbers large enough to effect permanent, continuous change in the cultural, fiscal, academic, governmental, and professional infrastructures that support the oceanic and atmospheric sciences.

The awareness of the need to increase diversity was reflected in the large number of people who attended the conference far greater than expected and the interest and actions of the attendees in following up on connections made at the meeting has been outstanding. The enthusiasm shown for making connections and building interactions between NOAA personnel and academicians has resulted in students being offered summer internships and employment, contracts awarded to several institutions, and a full-day grants conference targeting Institutions of Higher Education, with particular interest in Minority-Serving Institutions, held at the U.S. Department of Commerce.

Much excitement and great anticipation have been generated by the personal interest and commitment shown by U.S. Dept. of Commerce Deputy Secretary Robert B. Mallett who gave keynote addresses at both the UMES Expanding Opportunities and the Grants Conference held in September. Moreover, there is great anticipation for a potential MSIs Initiative to be championed by the Deputy Secretary. The hope is that it will be significant and that it will make a difference in the level of participation in NOAA mission work as well as across Commerce. In

the long run, any significant and sustained funding support to HBMSCUs should go far in raising the numbers of minorities in NOAA's occupational and academia's educational fields of research and development, public service, and resource management. This minority participation will ultimately extend to the public and private organizations which are partners and customers for NOAA's work.

Following the conference, a list of research opportunities that HBCUs could partake in has been compiled and placed on the web. A symposium discussing these opportunities took place in Annapolis, Maryland at the end of September. Also in September, the Department of Commerce held its first comprehensive financial assistance opportunities conference. In addition, NOAA has worked to reinstate a Graduate Research Fellows Program under the leadership of Mr. Scott Gudes, Deputy Under Secretary for Oceans and Atmosphere. NOAA leaders, in collaboration with its academic, private sector and other federal government partners formed during the conference, met to participate in a two-day National Science Foundation/Geo-sciences Workshop. The workshop was in the spirit of building stronger federal relations to reflect and focus on the concerns brought to the table by participants.

All of these immediate responses to the urgent nature of the conference focuses attention on how NOAA works to develop diversity. All too frequently, NOAA's support for HBMSCUs has been on an ad-hoc basis, underfunded and more concerned with outreach activities than with a logical and reasonably balanced involvement in mission program areas. This approach is not unique to NOAA and many federal agencies in the earth sciences have operated in a similar manner.

NOAA leadership must identify and implement the mechanism for systemic and dedicated coordination across the Agency and Commerce. Only a long-range, strategic plan can provide the fiscal, cultural, and professional support needed to sustain true diversity. The intent of this long-range planning is to aid HBMSCUs to become vested partners of NOAA and, thus, contribute to the efficiency of the Agency, carrying out its mission and honoring the public trust. Such critical and regular involvement would go a long way to contribute to and ensure HBCU leveraging power for funds from other federal, state, and private sources to continue building and strengthening institutional capacity in NOAA core and related science, engineering, and technology areas. Such real partnership support is thought to have far-reaching effects in undergirding the HBMSCU capacity to be stronger competitors for research grants, cooperative agreements, procurement contracts, and the like. Finally, a long-term, unified approach to solving the problem of "too few to count" will allow for a permanent, integrated change.

The need for a unified strategy does not eliminate the need for spontaneous and immediate response. All mechanisms—long-term and short-term, ad-hoc and systematic, spontaneous and integrated, bottom-up and top-down—must be employed. We cannot postpone the immediate

needs of the minority community while we develop a thoughtful long-range plan, but neither can we continue to apply short-term fixes to a long-term problem. We must make the infrastructure changes necessary to integrate minorities within all levels of the oceanic and atmospheric profession, most importantly in positions of true power, affecting finances, research, organizational structure, and academia. In doing so, we should emphasize the particular strengths and opportunities offered by HBMSCUs.

To ensure the coordination of policy and action on both the ad-hoc and long-term levels, we would urge that a committee, or some other mechanism, be established so there could be a continual process of oversight and dialogue. Such a committee can help NOAA, the HBMSCUs, and the private sector in setting clear agenda and priorities and in presenting a unified position by which to gain Congressional support.

One way to initiate long-term change, is for NOAA, through partnerships grants and contracts with HBMSCUs, to conduct and, where possible relocate, NOAA research on the campuses of these institutions. Sustaining year-round research alleviates several problems. Currently, faculty and students are farmed out for the summer to work at other institutions, while their state-of-the-art laboratories go unused. Remaining on their own campuses to conduct research year round builds the capacity to do competitive research, brings in much need research dollars toward overall research capability, promotes a climate of research excellence, and effectively utilizes equipment and resources. There is a tremendous need to build solid and continuous fiscal support to aid world class fellowships, scholarships, teaching assistantship, internships, all of which contribute to a healthy and sustained campus research environment. A recent development illustrates this promise. The University of Maryland Eastern Shore, The National Park Service and the Maryland Department of Natural Resources, through a \$1.5 million Economic Development Initiative grant from the federal government, have joined forces to establish a Coastal Ecology Teaching and Research Center at Assateague Island.

There are many advantages in collaborating with HBMSCUs research facilities. These partnerships ensure the involvement of students in the research enterprise, keep academia and NOAA on the same track in regards to research, and encourage state and private investment in university infrastructure. In addition, collaboration offers the flexibility of university investment, where funds can be reallocated to meet emerging needs and new faculty once goals are met, and the decentralized nature of universities which can lead to new directions in research long before the federal administrative structure can recognize potential opportunities.

It is important to review the research capabilities of HBMSCUs in a fair manner. Too often, the peer review system allows large, majority, research institutions to judge the capacity of the smaller, minority institutions. Large research universities are an important source of information and assistance, but they may not be fully aware of how to effectively use the smaller resources of

HBMSCUs. This is especially the case in the earth sciences where regionally, local geography provides unique research opportunities in the surrounding ecological/environmental setting of the institution. We advocate that the peer review system be modified to allow HBMSCUs to be judged by other, smaller research institutions, which have had the same level of funding as the HBMSCUs.

Conference participants also stressed the crucial nature of redefining science to become more interdisciplinary. Why do this? There is an emerging consensus in the earth and environmental science community that we must move in this direction. Nature does not divide itself into neat disciplinary compartments. Plans to increase diversity should cross the disciplines and should include management, particularly professionals in the management of natural resources such as the fisheries, as well as station management personnel as in weather. In so doing, NOAA would look broadly to see opportunities for partnering and must communicate this interdisciplinary stance through effective public relations. We should take the opportunity to develop access as we move to the new millennium since interdisciplinary fields are the wave of the future.

All of these actions need the support of the federal government. Because there are too few to count even within Congress it is crucial to educate Congress on the extent of the problem and the need for federal involvement. We need to attract the interest and support of members of Congress so they will advocate for increasing diversity within the oceanic and atmospheric sciences. Engaging legitimate bipartisan Congressional support is essential. A concept paper needs to be developed that could be distributed to legislators and their staff, and members in both the House and Senate that makes the case in terms of the national interest in increased minority participation in the oceanic and atmospheric sciences. With commitment and advocacy from HBMSCUs, broad coalitions of support can be generated for the investments and initiatives necessary.

Emphasis was also placed on the need to make full and wise use of one of NOAA's own natural resources NOAA employees who are graduates of HBMSCUs to follow through on conference promises yet to keep. Too often employees with this distinction are overlooked, not called on for their decision-making ability. This is especially when the decisions are managerial whether to resolve problems in human resource management, mission program management or when building relationships with the Agencies' constituents, including academia. In short, NOAA must empower its minority employees in addressing the critical issues and problems raised during the very productive two days at UMES.

One step in encouraging minority employees to speak up is for the leadership of NOAA to actively engage in changing the way NOAA does business. The new thinking on promoting diversity must be accompanied by action, changing the corporate culture to allow for full

representation of minorities at all levels, in significant numbers, and in positions of fiscal responsibility, strategic planning, and other positions of power.

Finally, as we plan for the next decade, the members of the Post-Conference Implementation Committee suggested that NASULGC work with NOAA to build a sustainable relationship so that diversity goals can be accomplished in tandem. For example, institutions' curricula can be better matched to NOAA's needs. Before a ten-year plan is established, the group recommended that NOAA, over the next year, examine where NOAA currently stands in its program to increase minority participation. After the baseline is established, NOAA can improve the situation over the next decade with clearly agreed upon measures of success. Since the members of the group itself represent only NOAA line offices, it was suggested that an intermediary could be appointed to interact between NOAA and the institutions, thus ensuring a closer working relationship and more likely success of implementing goals. We support the work NASULGC has done to promote diversity within their own institutions; we wish to continue the dialogue between the two agencies; and we acknowledge that the effectiveness of NASULGC in working with Congress provides a model for our own work.

It is our fervent desire that by implementing sustained, thoughtful change throughout NOAA and the institutions partnered with NOAA, we can institute and maintain true diversity, full representation for all Americans, within the oceanic and atmospheric sciences. This goal—the goal of long-term racial, ethnic, and gender equality—underpins the very nature of democracy.

There is no other way to succeed.

**Ambrose Jearld, Jr., PhD**  
Chairman, Steering and Conference Committees

## **XII. APPENDICES**

### **Appendix A: Steering Committee Roster**

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